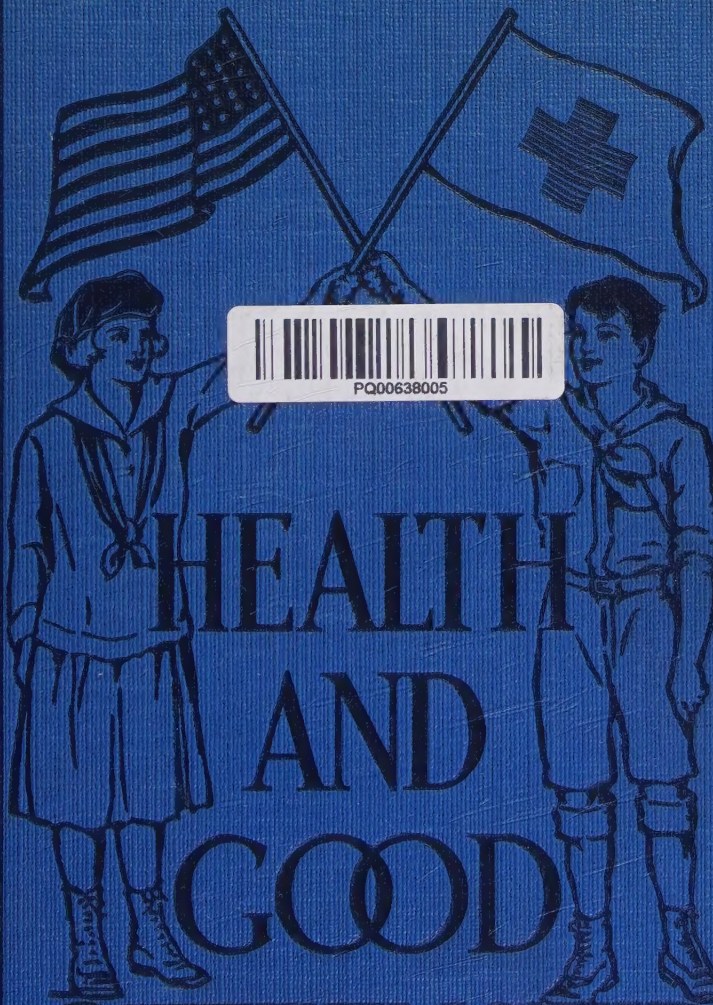


PQ00638005

HEALTH AND GOOD CITIZENSHIP

ANDRESS · AND · EVANS

Digitized by the Internet Archive
in 2025

https://archive.org/details/bwb_W9-CZF-734

THE PRACTICAL HEALTH SERIES · · BOOK TWO

HEALTH AND GOOD CITIZENSHIP

BY

J. MACE ANDRESS, PH.D.

LECTURER ON HEALTH EDUCATION, BOSTON UNIVERSITY

AND

W. A. EVANS, M.D.

PROFESSOR OF PUBLIC HEALTH, MEDICAL SCHOOL OF NORTHWESTERN UNIVERSITY, FORMER PRESIDENT OF THE AMERICAN PUBLIC HEALTH ASSOCIATION AND FORMER HEALTH COMMISSIONER OF CHICAGO

GINN AND COMPANY

BOSTON · NEW YORK · CHICAGO · LONDON
ATLANTA · DALLAS · COLUMBUS · SAN FRANCISCO

COPYRIGHT, 1925, 1926, BY J. MACE ANDRESS AND W. A. EVANS
ALL RIGHTS RESERVED

PRINTED IN THE UNITED STATES OF AMERICA

629.7

For the lower grades

The SUNSHINE SCHOOL *(Andress and Bragg)*

A JOURNEY TO HEALTH LAND *(Andress)*

The BOYS AND GIRLS OF WAKE-UP TOWN *(Andress)*

For the upper grades

HEALTH AND SUCCESS *(Andress and Evans)*

HEALTH AND GOOD CITIZENSHIP *(Andress and Evans)*

For high school

HEALTH ESSENTIALS *(Andress, Aldinger, and Goldberger)*

The Athenæum Press
GINN AND COMPANY · PROPRIETORS · BOSTON · U.S.A.

PREFACE

The keynote of this volume is SERVICE.

The boys and girls in the upper grades of the grammar school and the junior high school are at an age when they are thinking more about others than ever before. They are beginning to realize their common interest with the community. In their plays and games and spontaneous activities they are experiencing in a more pronounced way than hitherto the satisfactions that result from coöperating with their companions. The emotional life is quickened. Heroic achievements become more impressive. Idealism is in the making. Such rich soil offers abundant opportunity for the growth of American citizenship. During this important period what is most needed is the intelligent and sympathetic direction of children's activities. It is in these grades that a large number of children begin to drop out of school. Many of them may never learn the valuable lessons of health service unless they become imbued with the spirit of good citizenship during these years.

Fortunately the field of health teaching lends itself admirably to the ideals and habits of citizenship. To be capable of social service one needs first of all personal health. For this reason the first half of the book con-

cerns itself with the fundamentals of physiology and hygiene. The old fact-cramming physiology is rapidly disappearing from our progressive schools; but there is a general agreement that children today need to have substantial facts about the working of the human body. This is desirable not only to enable them to develop robust health intelligently and effectively, but also to satisfy their natural and legitimate curiosity. In the presentation of facts an attempt is made throughout the text to subordinate facts to principles of action. *Health habits are emphasized.*

Although the individual may do much to promote his own health, his success will be limited if others are not sensitive to community welfare. Water, milk, and food may be contaminated by others. Carelessness may lead to an epidemic. Teamwork is necessary in any community to insure the public health.

The second half of the book therefore attempts to present those facts about the health of the home, school, and community which will give pupils an insight into problems of social health, and inspire them to take part in their solution. The subject matter in the text offers some of the latest information. The exercises at the end of each chapter are intended to stimulate the self-activity, experimentation, and teamwork of the readers. Many group activities are suggested in the study of community health problems. To cultivate the ideals and

habits of service much new material is introduced in connection with health heroes, those men and women who have been of greatest service in promoting the health and welfare of mankind. Stories of Pasteur, Lister, Trudeau, Gorgas, Reed, and other noble men and women help to tell the fascinating story of the warfare against disease and the campaign for healthful living.

Thus there are seen to be at least four fundamental principles involved in health training for citizenship: (1) the establishing of personal and social habits making for health; (2) the acquisition of a body of accurate and wholesome facts about the science and art of healthy living; (3) the coöperative study by pupils of problems in community health and also a measure of participation by them in their solution; (4) the further inculcation of ideals of service through the study of health heroes.

Like the first volume of this series, "Health and Good Citizenship" aims to reflect through its text and exercises the best methods and devices of the newer health teaching. In keeping with the latest tendencies in this field, an opportunity is offered in nearly every chapter to correlate lessons in health with work in English, drawing, science, civics, manual training, and other school subjects.

Retaining all the educational features of the first volume, this book seeks to be a helpful tool for every teacher who desires to further a practical kind of citizenship in healthful living.

The authors wish to acknowledge their special indebtedness to "Health Education," the report of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, and to the various publications of the United States Bureau of Education and the American Child Health Association. Thanks are also due to Miss Louise Strachan, Director, Child Health Education, of the National Tuberculosis Association, for advice concerning that part of the book relating to the modern health crusade, and also to Miss Mabel C. Bragg, assistant superintendent of schools, Newton, who read the proof and gave many valuable suggestions. The authors are also particularly grateful for an intimate contact with the public schools of Newton, Massachusetts, which have assumed national and even international importance in health teaching.

To the scores of teachers, health workers, scientists, and investigators who have contributed directly and indirectly to this volume the authors express their hearty thanks.

J. MACE ANDRESS
W. A. EVANS

CONTENTS

CHAPTER		PAGE
I.	Healthy Citizens	1
II.	Forward, Knights!	9
III.	Under the Microscope	16
IV.	The Bony Framework of the Body	23
V.	Good Sportsmanship in Play	30
VI.	Training in the Use of the Body	42
VII.	Health and the Feet	50
VIII.	A Healthy Mouth	59
IX.	How Food is Digested	68
X.	Eat Plenty of Nourishing Food	77
XI.	Health and the Ductless Glands	95
XII.	The Work of the Blood	102
XIII.	Respiration and Ventilation	113
XIV.	Learning to be Attractive	129
XV.	A Healthy Mind and Nervous System	142
XVI.	Good Eyes and Ears	156
XVII.	Working for Safety	170
XVIII.	What to do in an Emergency	182
XIX.	Alcohol and Tobacco—Danger!	191
XX.	Unseen Friends and Enemies	200
XXI.	How the Body protects Itself	206
XXII.	Two Health Heroes	213
XXIII.	Trudeau's Great Victory	220
XXIV.	Away with Colds	229
XXV.	Protection of Children against Illness	236

CHAPTER PAGE

XXVI. The Welfare of Babies 244
XXVII. Health and the School 253
XXVIII. Good Housing 260
XXIX. Health in the Home 268
XXX. Home Care of the Sick 275
XXXI. Pure Water 282
XXXII. Pure Milk 290
XXXIII. War on Insects and Rats 299
XXXIV. How Children may help the Community . 314
XXXV. Keeping Healthy in Country and City . 324
XXXVI. Keeping Healthy during Travel and Vacation 333
XXXVII. Health in Industry 338
XXXVIII. Patent Medicines 344
XXXIX. Health Departments 350

BIBLIOGRAPHY FOR TEACHERS 363
APPENDIX 365
INDEX 385

Painted by N. C. Wyeth

AMERICA'S GREATEST WEALTH IS IN HER
HEALTHY CHILDREN

HEALTH AND GOOD CITIZENSHIP

CHAPTER I

HEALTHY CITIZENS

Life in the Open. What fun there is in camping! Summer and the great wide world call one everywhere. Camping means living in the out-of-doors—hiking, fishing, swimming, gathering wood, enjoying plain food, and telling stories around a blazing camp fire. There is the balsam fragrance of the woods, the breath of evening winds, crisp cool air, and deep sleep until the sun peeps above the eastern hills.

The boys and girls in the picture are camping with their families upon the heights. From their camp they can see the wonderful blue of the mountains and the little river that flows through the meadows in the valley.

It is the morning of the Fourth of July. The children are returning from a trip to the village. They are planning to march through the camps in single file, with the Stars and Stripes flying.

These campers, as you can see, are very happy. They have left a distant city, with its crowds and dust, behind them. How they are enjoying the out-of-doors! They are building up their health every day.

Helpfulness in Camping. It is not always easy to camp. Sometimes the supplies need to be carried long distances. The postman does not deliver mail at the tent; somebody must go for it. Clothes get soiled in camp, and there may be no laundry to take them away and return them nicely washed and ironed. It is not so easy to cook meals over a camp fire as over a range at home. Often the beds are not so comfortable as they were at home.

Yet there is no grumbling at this camp. The children call it Camp Sunshine. There are willing hands and feet to do all the work. Nobody calls it work. The children call it play. Wood, water, groceries, and mail are brought every day. Beds are made, dishes are washed, and there is plenty of time for the fun of the day.

One of the best things about camping is its lesson of self-reliance. Camping teaches one to be inventive, to get along, and to overcome difficulties. One reason why we enjoy the story of Robinson Crusoe is that we admire his courage and skill in meeting difficulties.

Health First. These campers believe that one of the best ways to be helpful is to keep in good health. If somebody should get sick he would not only lose all his fun but spoil the good time of the others as well. It would

be hard to get medicine and doctors and to take care of the patient. The others would have less time for hiking, swimming, and boating. The entire family might be obliged to go home, away from the cool water and the tall

© Publishers' Photo Service, Inc.

IT'S FUN TO CAMP IF ALL THE CAMPERS WORK TOGETHER TO KEEP THE CAMP HEALTHFUL

pines. There are many other good reasons why everybody at Camp Sunshine has trained himself to be healthy.

To be healthy in camp is not so easy as it may seem, for food may spoil, the milk may not be clean, and the water may be unfit to drink. The good camper looks after his own health and the health of the entire camp.

A Good Citizen. Everybody at Camp Sunshine is not only a good camper but also a good citizen. He thinks about helping both himself and others.

Ex-President Taft once said that it was the first duty of a citizen to be healthy. This is a new thought about citizenship. Usually when we think about good citizenship we think of obeying laws, voting, and paying taxes. We now know that one of the duties and opportunities of citizenship is to be healthy and to promote the health of home, community, city, and state.

None of us can do our part in having a healthful and beautiful neighborhood unless our neighbors help. If they are careless about their garbage, flies may breed in it and carry disease. If they allow water to stand in holes and barrels, mosquitoes may annoy the neighborhood. If they are careless about their own health, they may be ill and spread disease in the community.

A Health Heroine. One of the finest of American citizens was Clara Barton. Although she was a woman of means, she scorned the easy way in life. She loved to do hard things. When our Civil War broke out she volunteered to nurse the wounded soldiers and did many things at her own expense.

Finally she founded that wonderful society called the American Red Cross. There are now many thousands of Red Cross nurses in America. Whenever there is suffering because of flood, fire, earthquake, or accident the

Red Cross rushes to the scene to give aid to the sufferers, regardless of race, language, or religion. In war the Red Cross nurses are close to the battle line; in peace they care for the sick and teach people how to be healthy.

It is because of the unselfish work of citizens like Clara Barton that America has become the great and honored country that she is. Our best citizens devote their lives to the service of their fellowmen.

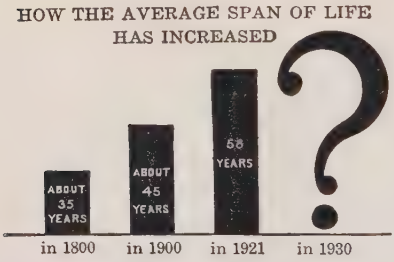
CLARA BARTON

One of America's noblest citizens. She founded the American Red Cross

Learning to be Healthy. There is a great struggle going on all the time to make America healthier. The best part of the story is this: In the fight for health America is winning one battle after another. Every day brings new victories.

Some of the most dreaded diseases, such as smallpox, yellow fever, and typhoid, have almost disappeared. Diphtheria and malaria are on the wane. A glance at the diagram on page 6 will show that as the years pass the average length of life is increasing. Such great victories have been won because the people have learned to

be healthier. The struggle is still going on. Dr. Irving Fisher says that on the average people could live about fifteen years longer if they would only practice the simple rules or habits of health more diligently. Some day the average length of life may be eighty, ninety, or one hundred years. What it will be in 1931, 1941, and 1951 depends largely on the boys and girls of today. The world will be a still cleaner and healthier place if they will do their part.



AVERAGE LENGTH OF LIFE

What was the difference between the average length of life in 1800 and that in 1900? between that in 1900 and that in 1921? If you have had percentage, figure up the per cent of increase in each case. Do you expect there will be another big gain by 1930? Why?

The purpose of this book is to tell the boys and girls who read it how they may be healthier and make their own homes and communities better places in which to live. In this way everybody may be a good American citizen.

Remember

1. There is fun and health in living out of doors.
2. A good camper is helpful; so is a good citizen.
3. Americans are learning to be healthier every day.

Write a list of other important things worth remembering from your reading of this chapter.

Things to Do

1. Write a composition telling about some experience you have had in camping. Tell what you did for your own health and that of the camp.

2. Imagine you are spending a month's vacation at Camp Sunshine. Write a letter to your teacher or to some member of the family telling about the things you did for health.

3. Try to find out whether the average length of life is increasing in your state. You may be able to get this information by writing to the secretary of your state department of health.

4. Write a list of adjectives suitable for describing a good citizen; a bad citizen. In which list will you put *honest*? *careless*? *clean*?

5. Invite a Red Cross nurse to tell the class what the Red Cross is doing in your community.

6. Find out some more facts about the life of Clara Barton.

7. Name other great citizens who have been of service to their fellowmen.

8. Read "Robinson Crusoe." Tell how Crusoe invented things.

Review and Thought Questions

1. What is the fun in camping?

2. Why is helpfulness necessary in camping? In what ways may a camper be helpful? How does camping teach self-reliance and inventiveness?

3. What are some of the health habits that a good citizen ought to have?

4. What kind of first-aid kit do you take when you go camping?

5. What special difficulties did Robinson Crusoe have on the island? How did he overcome them? What did he do to keep healthy?

6. What is the value of the camps of boy and girl scouts? What training for health do young men get in military training camps?

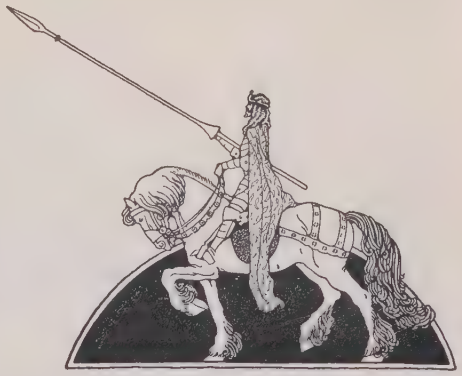
7. Why was Clara Barton a good citizen?

8. Why do you think that America is learning to be healthy?

CHAPTER II

FORWARD, KNIGHTS!

The Knights of Long Ago. Long ago, before Columbus set sail for the New World, the nobility of Europe lived in huge castles and fought their battles on horseback, clad in shining metal armor. Many of these nobles were knights. We should know little about them except for the songs, stories, and poems which have been handed down from that early day.



THE GALLANT KNIGHT KEPT IN GOOD HEALTH AND DELIGHTED TO SERVE OTHERS

Nobody was born a knight. If one wished to become a knight he left his father's house at the age of seven and went to live at court or in the castle of a knight, where he learned to do common tasks like waiting on table; for those who wished to become knights must learn the great lesson of service. He also learned to be polite, to vault on a horse, and to wield a battle-ax.

When he had become well trained he was made a knight. It was a wonderful ceremony. At that time the true knight gave up all thought of himself. He took vows to be generous and courteous, not to quarrel, but ever to draw his sword in defense of the helpless and to serve womankind. He was to keep himself strong, physically fit, and ever clean-minded.

The rule of the gallant knight is well expressed by an old French poet, Eustache Deschamps.

> Be meek of heart! Work day by day!
> Tread, ever tread, the knightly way;
> To everlasting honor cling,
> Let none the barbs of blame to fling.
> Be open-handed, just, and true;
> The paths of upright men pursue;
> Do you brave things, great and right,
> This is the rule of the gallant knight.

Sometimes upon the field of battle a man might be knighted for some brave deed. The king would take his sword and touch the man's shoulder with it and say, "Arise, I dub thee knight."

The Modern Health Crusaders. The knights of the Middle Ages are no more. Their armor hangs on museum walls, but their gallant deeds are still remembered.

In their place we have the Modern Health Crusaders, made up of millions of boys and girls in America and foreign lands. They too look forward to being knights

and wearing a badge of knighthood. They seek physical perfection. Like the knights of old they know that anything near perfection in character, courtesy, or health must come through daily training. Knighthood must

A HAPPY DAY FOR THE CHILDREN

These children are being made Knights of the Round Table because they have done so much for their own health and the health of others. (Courtesy of National Tuberculosis Association)

be earned. Day after day they work hard to get those health habits that will make them strong, well, and happy.

Even if you are not enrolled among the Modern Health Crusaders, you will be interested to know how boys and girls in the upper grades train themselves in health habits. Below is a list of the health chores used by the Modern

Health Crusaders. Study this list carefully. Practice the health habits until you do them so well that it is no longer necessary to think about them. Go over the list every day and put an X after each one of the habits that you practiced.

1. I gave careful attention to personal cleanliness and neatness of appearance today. I tried to keep my surroundings sightly and sanitary.
2. I sought to keep the ventilation good and the temperature under 70 degrees in every room I occupied.
3. I tried to be cheerful, straightforward, and clean-minded; to do one thing at a time and the most important thing first.
4. I was careful to do nothing to hurt the health of anyone else. I played fair; I did willingly at least one kind act for another person.
5. I used no tea, coffee, nor any harmful drink, no tobacco in any form, nor any injurious drug.
6. I tried to have a "balanced" diet, including energy-making, tissue-building, and regulating foods. I was careful not to overeat but tried to keep my weight right.
7. I held reading-matter not less than twelve inches from my eyes. I did not read lying down or with straining light or facing the light.
8. I gave proper attention to elimination.
9. I played or exercised for at least an hour in fresh air, avoiding over-fatigue. I breathed deeply and was careful to keep good posture.
10. I was in bed ten hours last night, windows open. I did not allow a pillow to make me "round-shouldered."
11. Besides bathing this week, I washed or otherwise thoroughly cleaned my hair and scalp on each day checked.

Gain in Weight. Thousands of school children, including the Modern Health Crusaders, are interested in gaining in height and weight. In many schools children are measured two or three times a year and weighed monthly.

© Underwood & Underwood, N.Y.

HEALTHY CHILDREN GAIN IN WEIGHT

We now know that if children have the right kind of health habits they will usually gain in weight through the year. Children who are ill or have physical defects like adenoids or diseased tonsils often do not gain. If a child does not gain in weight or loses in weight for several months, something is wrong. Either better habits should be formed or a doctor should be consulted.

Keep a graph of your gain in weight similar to that on page 15. In checking up your own height and weight look up the tables in the Appendix at the end of the book.

Remember

1. The true knight learned the lesson of service: he helped others.

2. He trained himself in good habits.

3. The Modern Health Crusader helps others to be happy and healthy.

4. He trains himself daily in health habits.

Things to Do

1. Keep your own record of health chores.

2. Read some good stories or books on knighthood and report to the class.

3. Write to the National Tuberculosis Association, 370 Seventh Avenue, New York, for more information about the Health Crusaders. Find out how one may become a Knight of the Round Table.

4. Give a two-minute talk to the class on the practice of some one of the health chores.

5. Keep a health scrapbook. Paste in it pictures and newspaper clippings about health.

6. Make a health poster on one of the health chores.

7. Commit to memory the rule of the golden knight.

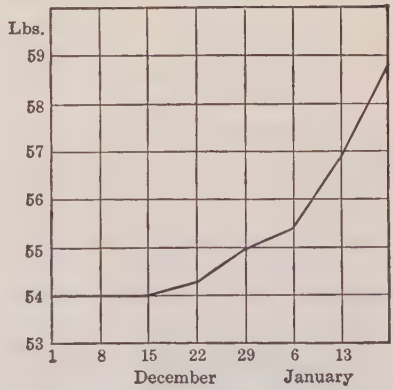
8. Tell how the Lilliputian boys and girls were trained in "Gulliver's Travels."

9. Have a health honor roll in your room. Put on the blackboard under the words "Health Honor Roll" the names

of those pupils who do some health service for others. Start a new list of names each month. Get the class to decide on a list of all the different forms of health service that shall entitle a pupil to have his name placed on the honor roll.

10. Write out a model health schedule for a day for yourself. Put down the time when you will arise, clean your teeth, wash your face, eat your breakfast, what you will eat for breakfast, etc.

11. Make plans for a health bank. Let the class make out a list of health habits. Let the practice of one habit for a day be equal to two cents, of others three cents, etc. Let every child make a health bank book. Elect a banker in your class. As each pupil reports daily, the banker will give to each the proper credit in dollars and cents for the habits practiced.



JANE GAINS IN WEIGHT

Jane was twelve pounds under weight. She was not gaining. As soon as she began to eat slowly instead of bolting her food she gained rapidly. Keep a record like Jane's above of your own gain in weight

Review and Thought Questions

1. How did one become a knight in olden days?

2. What was expected of a knight?

3. How many of the health chores do you do every day? Which ones do you especially need to practice?

4. If a child does not grow in height and weight, what does it mean? What may a child do to make such gains?

CHAPTER III

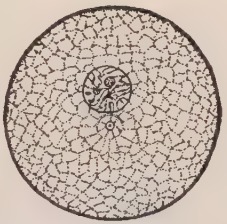
UNDER THE MICROSCOPE

The Human Machine. The body is an engine similar to other engines in that it requires fuel, generates heat, performs work, and gets rid of waste products. Unlike other engines, it grows, repairs itself, and is self-directing. Because of these differences it is proper to speak of it as a *human* machine.

If our bodies are to be kept fit for work and play, it is necessary that we should know something about them. The study of the material of which the body is made, its structure, is called anatomy. Physiology tells about the way the body behaves or works. Hygiene tells about the proper care of the body.

The Cells. As one looks down a long street at a big brick building its walls seem made of one piece of solid masonry. As one gets close the walls are seen to be made up of thousands of bricks held together by mortar.

Our own bodies are somewhat like a brick building. To the naked eye the flesh seems as solid as does the brick wall in the distance, but under the microscope we behold one of the wonders of the human body. The entire body is found to be made up of little bodies called cells.

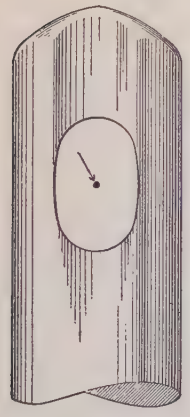


A CELL

The large dark mass in the center is the nucleus

Every living thing is composed of cells. Plants, trees, and insects look quite different under the microscope. The cells may differ in color and shape, but they are all alike in being very small living bodies.

Living cells are so small that if two thousand of a certain kind were stretched out in a straight line they would measure about an inch. Although the cells are quite different when seen from the outside, they are very much alike within. They have each a cell wall, and are filled with a fluid substance called protoplasm. The protoplasm is the living part of the cell. Within the cell is a dense part of the protoplasm called the nucleus. This is the center of the cell's life. If the nucleus is injured, the cell soon dies.



THE SIZE OF A CELL COMPARED WITH THE EYE OF A VERY SMALL NEEDLE

Both the cell and the needle eye are highly magnified

How the Cells Grow. Growth in the body is brought about more by an increase in the number of cells than by an increase in their size. Each cell divides and makes two cells. When each of these cells has grown as large as the parent cell, it divides again, and so the process goes on. In this way a burn or cut heals.

A REMARKABLE PROCESS THAT A CELL HAS TO GO THROUGH TO BECOME TWO CELLS

Different Tissues and their Work. In some ways the human body is like a community.

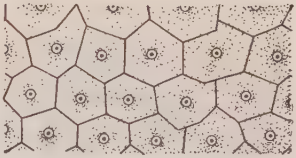
In any town there are groups of people having particular kinds of work to do. There are bankers, barbers, tailors, merchants, clerks, and teachers. Each group is necessary for the welfare of the entire community. Think what would happen if every grocer went out of business.

The body is one vast community of cells. There are so many of them that even if you could see them all under the microscope and count them, working eight hours each day, it would take many weary years before you finished your task. Yet each cell has its important work to do. A strike of any of the groups of similar cells in the human body would be fatal.

These groups of similar cells are called tissues. Four important kinds are:

1. *Epithelial tissue.* This covers the surface and lines every tube and cavity of the body. It is found also in many of the glands; for example, the liver and the kidneys. The teeth, skin, hair, and nails are all composed of epithelial cells.

2. *Connective tissue.* This is the material which binds all the other cells together. If we did not have this kind of tissue the body would divide into all its separate cells. When corned beef is thoroughly cooked, notice that the various fibers drop apart. This is because the connective tissue has lost its strength. The connective tissue is the material seen between the fibers. The elastic tissue found at the tip of the nose and in the ear, called cartilage, belongs to this group. The bones are connective tissue. The cords called tendons that usually tie the muscles to the bones are also connective tissue.



SOME EPITHELIAL CELLS RESEMBLING A STONE WALL

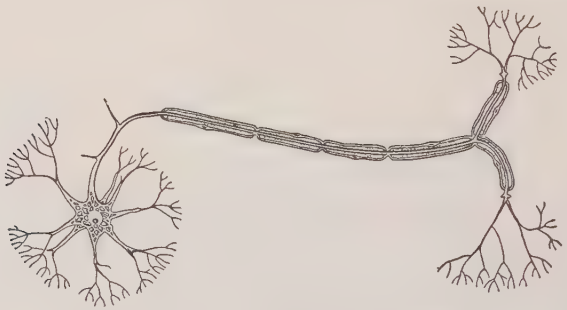
A FIBER OF MUSCLE USUALLY ENDS IN A TENDON

3. *Muscular tissue.* Without this tissue it would be impossible to act. It would be impossible to wink an eye or crook a finger. Action is possible because this tissue has the power of contraction and expansion. It can make itself long and short. Notice as you lift your forearm that the large muscle of the arm becomes shorter and thicker. As you lower the forearm it becomes longer and thinner.

4. *Nervous tissue.* The brain and other parts of the nervous system are composed of this tissue. Without the nerve cells it would be impossible to think.

The tissues are the materials that compose the body, just as lime, brick, stone, wood, and cement are the materials used in building.

The nervous and muscular tissues serve the body in thinking and acting. The epithelial and connective tissues protect and support the muscular and nervous tissues.



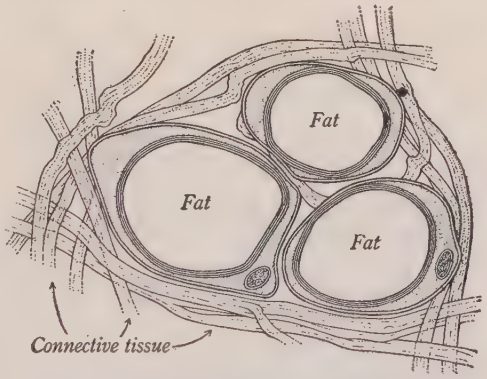
A NERVE CELL AND ITS FIBER

Tissues form Organs. Not only do the cells which form tissues work together, but different groups of tissues may work together. Such a combination of tissues grouped for some special kind of work is known as an organ.

The stomach is a good example of an organ. It has muscular, nervous, epithelial, and connective tissue all combining to form an organ capable of digesting the food. The heart, lungs, and liver are other examples of organs.

Organs form Systems. One of the wonders of the human body is the way the different organs of the body

may work together to do a particular kind of work. Such a combination of organs is called a system. One of the most important systems in the body is the circulatory system. The heart, veins, and arteries all work together to carry the blood around the body. The other systems are the muscular, bony, digestive, respiratory, and nervous systems, which we shall hear more about later in this book.



PARTICLES OF FAT HELD TOGETHER BY CONNECTIVE TISSUE

The body is healthy only when the different systems work in harmony. If one system fails to do its work, then the others are hindered.

Remember

1. The smallest part of the body is the cell.
2. The cells can be seen only with the microscope.
3. Groups of similar cells doing the same kind of work are called tissues.
4. Tissues combined for definite work make organs.
5. Organs working together are called systems.

Write down other things worth remembering from the reading of this chapter.

Things to Do

1. Peel an orange and separate it into parts. Tear each part and notice the cells. Notice the cell wall and the cells filled with juice. Are the cell walls held together by any connective tissue? Find it. Each of these so-called cells is composed of thousands of real cells.

2. Fill a tumbler partly full of large beans. Pour over the top enough melted gelatin to cover the beans. When the gelatin hardens invert the tumbler. What might represent the cells? the connective tissue?

3. Find the connective tissue in a piece of corned beef. Find some muscle fibers.

4. Study the figures of cells in this chapter and tell all you can about them.

Review and Thought Questions

1. Why should we know about the parts of the human body?

2. What are the parts of a cell?

3. What do the cells resemble in a brick building?

4. How many should you expect to find if they were laid in a straight line for an inch? a foot? a yard?

5. How is the body like a community?

6. What is a tissue? What are the different tissues and what work does each do?

7. Name some organs not mentioned in this chapter.

8. What is a system? Tell all you can about some system. Name some of the systems of the human body.

CHAPTER IV

THE BONY FRAMEWORK OF THE BODY

Why a Framework is Needed. When a building is being constructed, one of the first things noticed is a framework. This is often made of big pieces of timber or iron or steel. The framework gives a general idea of the shape which the building is going to have. This framework is so necessary that if it gives way the whole building may crumple and be a complete wreck.

If the framework of bones or the skeleton of the human body should become weak and give way, the body too would be wrecked. The bones give the body support. Without the bones it would be impossible for us to stand erect.

The bones also protect the vital organs of the body. The bones of the skull protect the brain. The ribs protect the heart and the lungs.

The bones also offer a place for the attachment of the muscles, so that easy movement is possible. Not all the bones move, but those that do move have attached to them at least two sets of muscles. Most muscles are arranged in pairs. While one muscle contracts, or becomes shorter, the other relaxes and becomes longer.

Some of the muscles end in stout cords called tendons. These can be felt at the elbow and below the knee. If the muscles were to extend down to the fingers, they would make the hand very clumsy.

a *b*

SECTIONS OF BONES

a, cut lengthwise; *b*, cut crosswise. Notice the branching canals. These contain nerves and blood vessels

How Bones are Made. The bones are made of animal and mineral matter. The mineral matter is chiefly lime. The animal matter is a kind of gelatin. It is the mineral matter which makes the bones hard. The animal matter, the living part of the bones, gives them elasticity. In childhood the bones contain much more living matter than in old age. That is the reason why children's bones sometimes will bend before they will break. In old age the bones become brittle and break readily instead of bending.

If a long bone were sawed lengthwise, it would be found to be hollow. This makes the bone light. It is also stronger than it would be if the same amount of bone material were in a solid mass. A cross section would show not only the long hollow part in the center but also other branching and communicating canals. In these canals are the blood vessels and the nerves. In the little spaces

in the bone are living bone cells that manufacture the hard bone tissue. The large canal in the bone contains a soft yellowish-red substance called marrow. It is full of fat and is what gives the rich flavor to a soup made from beef knuckle and the like.

A BONE CELL

A living bone is full of cells like this; such cells build and repair the bones. Good food helps the cells

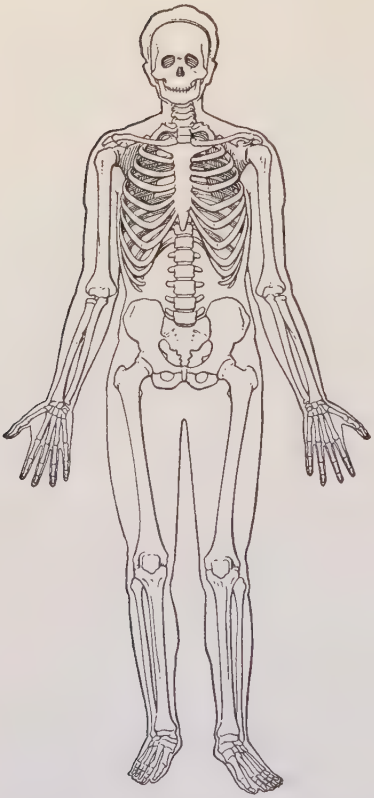
Parts of the Skeleton. There are about two hundred bones in the body. They have different shapes according to their uses.

The skull contains the bones that make up the face. It also provides protection for the brain. The arched form of the skull is so constructed as to resist blows and pressure.

The backbone, or vertebral column, consists of twenty-eight bones. They are quite irregular in shape, to provide for the attachment of muscles and tendons, and are called vertebræ.

The thorax, or chest, is formed by twenty-four ribs, a sternum, or breastbone, and twelve of the upper vertebræ. Each of the ribs is fastened to a vertebra in the rear. Only seven pairs of ribs join the sternum in front. These are called the true ribs. Each rib of the next three pairs is joined to the rib above by cartilage. They are the false ribs. The last two pairs, called the floating ribs, are free.

The bones of the arms and legs are long and slender.



STUDY THIS DRAWING OF THE SKELETON AS YOU READ THIS CHAPTER

The Joints. The place where the ends of two bones meet is called a joint. Some joints are immovable; for example, those of the skull surrounding the brain have no movement. They fit closely into each other by means of toothed edges.

There are at least three kinds of movable joints.

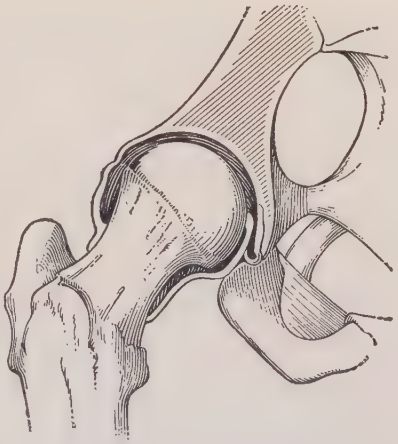
The hinge joint moves in two opposite directions but never sidewise. It works in much the same way that a door hinge does. The joint at the elbow is a hinge joint. Can you think of some others?

A second kind of joint is the ball-and-socket joint. It gives much greater freedom of action than a hinge joint. The joint at the shoulder is a good example of the ball-and-socket joint. The large bone of the arm, the humerus, has a ball which fits into a socket at the

shoulder. The arm not only can be raised and lowered as if it were on a hinge joint but can be moved around in a circle.

In the gliding joint the bones move or glide over each other. Such joints are found between the small bones of the ankle and of the wrist.

The bones are held together at the joints by strong cords, called ligaments.



A BALL-AND-SOCKET JOINT AT THE HIP

At all movable joints the surface of each bone is covered with cartilage. This surface is so hard and smooth that the bones can move easily. A thick, oily fluid oozes out of the membranes at the joints and keeps them well oiled.

Food and Sunshine for the Bones. If the bones are to grow and be strong and healthy, they must be properly nourished. Plenty of good nutritious food, such as milk, eggs, leafy vegetables, and fruit, is necessary to supply bone material.

It has been proved that, in addition to food, children need a good supply of sunlight. In a certain pass in Switzerland it was found that babies born in the fall had

rickets. This means that they had soft bones. The babies born in the spring escaped. What was the trouble? The pass is among high mountains, which shut out the sunlight for all but a few hours a day. It is so cold up there that during the winter the babies are kept indoors and get very little sunshine. The babies born in the spring have a chance to live for several months before they are shut in. The sunshine helps to give them good bones.

Remember

1. The bones give the body form and protect the vital organs.

2. They contain much living matter, such as nerves and blood vessels.

3. Joints and muscles are necessary for bodily movement.

4. Good food and sunshine are necessary for healthy bones. What else do you remember about the bones?

Things to Do

1. Get a long beef bone at the market. Saw it crosswise and lengthwise. Notice whether it looks like the drawings on page 24. Describe everything you see.

2. Try to see or feel the tendons at the elbow, at the back of the hand, and in the front of the wrist.

3. Soak a long bone for several days in muriatic acid. Then try to bend it. Can you tie it in a knot? What do you think has taken place?

4. Burn a piece of bone in the furnace. Then pound it with a hammer. What happens? What has the bone lost? Has it lost its animal or mineral matter?

5. Turn to the drawing of the skeleton on page 26 and locate all the different bones and joints you can.

Review and Thought Questions

1. What purposes do bones serve?

2. How many bones are there?

3. What two kinds of matter are found in the bones? What is the importance of each? What is lacking in the case of rickets? What are some of the causes of rickets?

4. What are the different parts of the skeleton?

5. What is a joint? How many kinds are there? Name them.

6. Of what use are the tendons?

7. What kind of skeleton does a turtle have? Can you think of any way in which it is superior to the human skeleton?

8. What bones of the human body remind you of a scaffold?

9. What bones and joints remind you of a door?

10. How do the bones change position to produce stoop shoulders?

11. What can we do to keep the bones healthy?

CHAPTER V

GOOD SPORTSMANSHIP IN PLAY

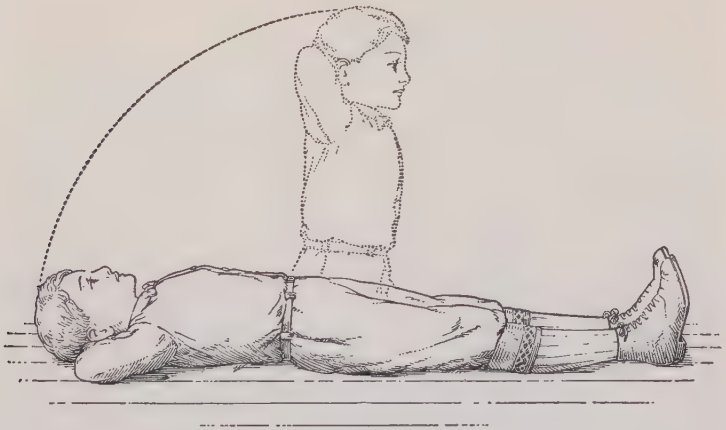
When Man was a Savage. Long, long ago, before Columbus discovered America, even before there was a king in England, all men were savages, who lived in caves, tents, or wigwams and hunted with spears and bows and arrows. In those days both men and women used their muscles a good deal, especially the big muscles of the legs, arms, and trunk. Hunting, fishing, and rowing a boat kept these big muscles of the body strong.

Today babies are born with the same muscles that babies had many centuries ago. These muscles make up about half the weight of the human body; but civilized man does not use his muscles, especially his large ones, enough. He walks very little and in his work often uses only the small muscles of his fingers and eyes. Frequently the only trunk muscles he uses are those involved in bending over a desk. This is too often true of children as well as of adults.

We are far healthier in most things today than we were when man was a savage, but we could be still healthier if we copied the savage man in using our large muscles more. The exercise of these muscles, especially in play, sharpens

the appetite, strengthens the heart and lungs, helps the digestion, and relieves mental fatigue. Most play should be in the open air.

Fun on the Playground. It was a great day for city childhood when the first playground was established in



AN EXCELLENT KIND OF EXERCISE FOR THE ABDOMINAL MUSCLES

Lie flat on the floor with arms in a position similar to that of the boy above. Then take a sitting position slowly while keeping the feet on the floor. Next let the body relax until stretched flat on the floor

Boston in 1893. The cities had been growing so fast that it was hard for children to find any place to play except on the streets, where there was likely to be danger from filth and accidents. It was such a fine thing for children to have broad open spaces with plenty of good air and sunshine that other cities began to establish

playgrounds, until now every city in America that is looking out for the health of its children has playgrounds. Many country communities also realized that their school yards were too small for play, and bought more

© Keystone View Co.

PLAYGROUNDS HELP TO MAKE GOOD CITIZENS

land for playgrounds; and some rural communities set aside a field day for the play of both young and old.

The playground is good for the little children because it usually provides sandboxes, slides, and open spaces where they can run. It is excellent for the big children also because they have a chance to play games like baseball, football, and hockey. They learn, too, how

to play on teams. All these games require the use of the big muscles of the body.

The Test of Good Sportsmanship. The good player not only develops a strong body but learns how to treat his

GOOD SPORTSMANSHIP

companions fairly and squarely. Good sportsmanship stands for the highest kind of manhood and womanhood. It means, among other things, playing hard, fair, and courteously.

On the following page is a list of points in good sportsmanship offered by the State Department of Physical Education of New York:

A GOOD SPORT DOES THESE THINGS

1. Plays fair at all times.
2. Plays hard to the end.
3. Keeps his head.
4. Plays for the joy of playing and for the success of his team.
5. Is a good teamworker.
6. Keeps training-rules.
7. Obeys orders of coach or captain.
8. Does his best in all school work.
9. Backs his team in every honest way, but—
10. Gives his opponents a square deal.
11. Is respectful to officials. Accepts adverse decisions graciously. Expects the officials to enforce the rules.

WHEN HE LOSES

12. Congratulates the winner. Gives his opponents full credit. Learns to correct his faults through his failures.

WHEN HE WINS

13. Is generous. Is modest. Is considerate.

AT ALL TIMES

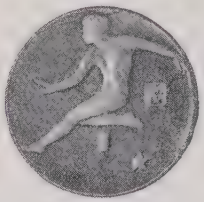
14. Is true to his highest ideals.

A GOOD SPORT DOES NOT DO THESE THINGS

1. Does not cheat.
2. Does not quit. Is not "yellow."
3. Does not lose his temper, even though wronged.
4. Does not play for money or other reward.

5. Does not play "to the grandstand."
6. Does not abuse his body.
7. Does not shirk.
8. Does not neglect his studies.
9. Does not bet. Does not think betting necessary to show loyalty.
10. Does not take any technical advantages. Treats visiting players as guests.
11. Never blames officials for defeat. Does not "crab." Does not "kick." Does not complain.
12. Does not show his disappointment. Is not a "sorehead." Does not "alibi." Does not make excuses.
13. Does not boast. Does not crow. Does not rub it in.
14. Does nothing unworthy of a gentleman and a 100 per-cent American.

How to win an Athletic Badge. Boys and girls who wish to improve themselves in activities which use the big muscles and to win a badge may do so by passing athletic badge tests recommended by the Playground and Recreation Association of America, 1 Madison Avenue, New York City. (See page 39.)



BOY'S BADGE FOR FIRST TEST

GIRL'S BADGE FOR FIRST TEST

There are three tests for boys and three tests for girls. For rules and instructions send to the Playground and Recreation Association of America for the booklets "Athletic Badge Test for

Boys" and "Athletic Badge Test for Girls." Each costs five cents. An athletic badge in bronze is offered for each test. Points in this contest up to 30 will count for the Round Table of the Modern Health Crusaders.

WINNING HEALTH AND AN ATHLETIC BADGE

How many badges will your room be able to get this year?

The Delights of Walking. Although there are many forms of exercise and many games that are very valuable for health, walking is a kind of exercise that everybody may enjoy with little or no expense and at any season of the year. Probably the vigor of the average Englishman is due more to the national interest in out-of-door walking than to anything else. Most of Great Britain's literary men were devoted to walking. Sir Walter Scott despite his lameness walked twenty or thirty miles a day with pleasure. Wordsworth even at

sixty walked twenty to thirty miles a day. He was also a peerless mountain climber and skater. Dickens thought nothing of walking twelve, fifteen, or twenty miles a day. The artist Turner often walked twenty miles in a day, stopping now and then to rest and sketch along the way.

PUPILS OF THE PHILADELPHIA PUBLIC SCHOOLS ON A WALKING TRIP
Courtesy of A. C. McBride

Good Sportsmanship in Walking. Fortunately there is now a growing interest in walking in America. It has been made popular by the Boy and Girl Scouts and various clubs such as the Appalachian Club. In at least one city, Philadelphia, efforts are being made to encourage walking. Since 1909, Saturday afternoon walks have been planned by Dr. W. A. Stecher, the director of physical

education in the public schools. Not only the children but older people are invited to take part. Good sportsmanship is encouraged by the following rules:

"Follow the leader," and so avoid mistakes and delays.

Conduct yourselves in such a way that you will always be welcome to return.

Be sparing in the collection of wild flowers, especially those depending on seeds for future growth.

Respect private grounds that owners kindly allow you to traverse, closing gates and leaving everything as you find it.

Leave no lunch boxes, paper, or refuse about to mar the beauty of the woods and fields.

On highways without sidewalks keep on the left side of the road, passing to the left of approaching vehicles.

Remember

1. About half the body is muscle.
2. To be healthy we need to exercise the big muscles.
3. Playgrounds help to make good citizens.

What other important facts do you remember from reading this chapter?

Health Habits

1. Play every day in the open air.
2. Learn to play games that require the use of the large muscles.
3. Cultivate the habits of good sportsmanship.

FIRST ATHLETIC BADGE TEST FOR BOYS

1.	Pull-up (chinning)	4 times
	or	
	Rope climb (using both hands and legs)	12 feet
2.	Standing broad jump	5 feet, 9 inches
3.	60-yard dash	9 seconds
	or	
	50-yard dash	8 seconds
4.	Baseball throw (accuracy)	3 strikes out of 6 throws at 40 feet
	or	
	Baseball throw (distance)	130 feet

FIRST ATHLETIC BADGE TEST FOR GIRLS

1.	Balancing (1 deep knee bend)	24 feet, 2 trials
2.	Potato race	22 seconds
	or	
	All-up Indian-club race	30 seconds
	or	
	50-yard dash	8 seconds
3.	Basket-ball throw (distance)	35 feet
	or	
	12-inch indoor-baseball throw (accuracy)	2 strikes out of 5 throws at 25 feet
4.	Volley-ball serve	2 in 5
	or	
	Tennis serve	3 in 6
	or	
	Basket-ball goal throw (10-foot line)	2 in 5
	or	
	12-inch indoor-baseball throw and catch	3 errors allowed

Things to Do

1. Write out a list of all the games you play and the kinds of exercise you take. Put the activities which use the large muscles into one group and the activities which use the smaller muscles into another.

2. Let each member of the class get information from some adult in the neighborhood as to the kind and amount of exercise he takes every day. Do not mention names. Does your study show that enough exercise is being taken?

3. Write a story or play about a boy or girl who showed good sportsmanship.

4. Give a three-minute talk on the value of playing tennis, hockey, skating, swimming, croquet, baseball, or football.

5. Read biographical sketches of prominent Americans and Englishmen. Find out what outdoor exercises and games they enjoy most.

6. Give some examples of good sportsmanship. May one practice good sportsmanship in other things than games? How?

7. Write to the Playground and Recreation Association of America, New York City, for information about the athletic badges.

8. Make some apparatus for your school playground.

9. Discuss ways of protecting little children on the playground.

10. Learn to play some games that are good for health.

11. Get a map of your city and mark with a colored pencil every playground. Does every child in your community have a chance to go to a playground? How may playgrounds make good citizens?

Review and Thought Questions

1. What was one of the chief differences between the life of the Indian and that of the civilized man of today?

2. What bad habits is a bookkeeper likely to get that the Indian would not get?

3. Why are the activities of the big muscles valuable?

4. Is your community provided with playgrounds? Do they provide for both the younger and the older children? How? Does your town or community provide for recreation and play in winter? Explain.

5. Why is a chinning exercise valuable?

6. What are the advantages of playgrounds for city children? for country children?

7. What are the fourteen points in good sportsmanship?

8. How can one win an athletic badge?

9. Why are football and baseball especially valuable in teaching good sportsmanship?

CHAPTER VI

TRAINING IN THE USE OF THE BODY

Our Debt to the Indian. The early settlers in the New World owed many a debt to the red man. From him they received two new and excellent foods—potatoes and Indian corn. From him they learned how to trap the wild animals and new ways to fertilize the soil to grow grain.

There is another debt that is seldom mentioned. The Indian gave us one of the very best examples of good posture. Whenever the great artists have portrayed him, whether on canvas or in stone, they have always represented him as standing and sitting tall. In history he is usually described as being "straight as an arrow." The example of the red man is one that we may follow if we wish to travel on the road to success and beauty.

The chief reason why the Indian had such splendid posture was that he did not have the bad habits of bending over to read or to work at a desk. As the Indian has become civilized he has learned some of the bad habits of the white man. The civilized Indian stoops like the white man.

Good Posture in Art. Sitting and standing tall is necessary for a really fine appearance. The best artists

and sculptors all know very well indeed the value of an erect posture to express the ideal of physical beauty.

What is true of art today was true in the centuries gone by. Greeks who lived even before the time of Christ were fond of beauty. They left many beautiful statues. Incorrect posture would be ugly; therefore the artists have made their statues erect.

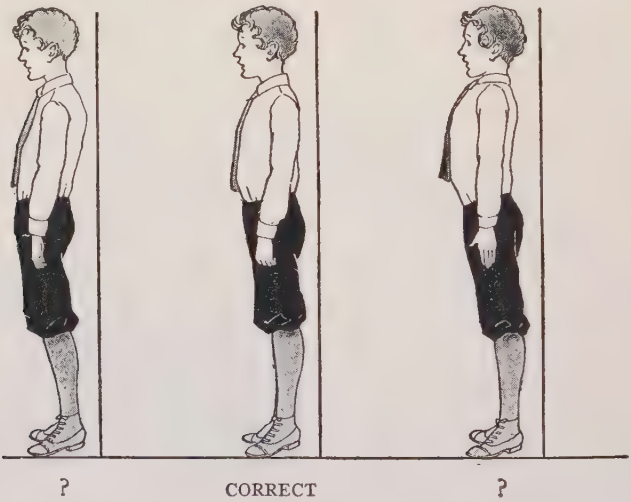
STATUE OF MASSASOIT

This statue, at Plymouth, Massachusetts, is an example of perfect posture

Picture to yourself the ugliness of a company of soldiers who were slouchy on the march. One reason why we like to see soldiers is because of their fine appearance.

Standing and Sitting Tall. Erect standing posture is maintained by holding the body as tall as possible without actually rising on the toes. The sitting position should be one in which the body is kept straight from the hips to the neck. The feet should always be squarely on the floor. In leaning forward the body should be bent at the hips only.

Correct Posture and Health. Sitting and standing tall give plenty of room for the vital organs, such as the heart, lungs, stomach, kidneys, and many smaller organs that lie in the abdomen. Dr. Goldthwait says that "the diameter through the chest from front to back is, on the

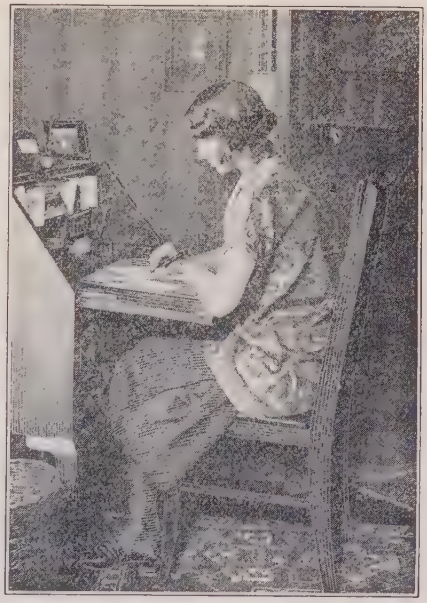


What is the matter with the standing positions of the other two boys?

average, one inch greater than it is when we stand with the shoulders drooping forward." It is easy to understand that bad posture makes for weak heart and lungs and often leads to disease. The pressure downward upon the organs of the abdomen also interferes with the circulation of the blood and causes these organs to sag. Indigestion, constipation, nervousness, and headache are

some of the maladies due to bad posture. When the bad posture is corrected these difficulties often disappear.

Good Posture makes Work Easier. The little baby in learning to sit alone or to walk must find out how to keep its balance. It finally learns to do this, but not always in the best way. If the body is bent over or stooped, it is much harder to sit or stand. If during our waking hours we are all the time using unnecessary energy to sit and stand, we usually do less work and become more fatigued than we should if we sat and stood correctly.



A CORRECT SITTING POSITION

Some manufacturers have so realized the importance of good posture in their shops that they have installed the very best kind of chairs and furniture. In some cases they have changed the machinery so that the worker can take a good posture. They believe that by doing this more work can be done and there will be fewer absences from work on account of overfatigue and illness.

What is true of the shop is true of the school also. Children with poor posture find it more fatiguing to do their school work than those who sit and stand properly. Not only should they try to form good habits of posture but they should see that their seats are properly adjusted so that it will be easy to sit erect.

WRONG RIGHT

Stretching is an excellent exercise for good posture if the body is kept in the correct position

How to get a Good-Posture Pin. Boys and girls who pass the triple test in (1) standing, (2) marching for at least three minutes, and (3) corrective exercises may earn a beautiful good-posture pin. Information about this test may be secured by writing to the Good Posture League, 1 Madison Avenue, New York. The pin may be secured only after the teacher certifies that the test has been passed satisfactorily. To win such a pin is an honor.

Exercises for Good Posture. Many of the physical exercises for the classroom are excellent training in good posture. The following setting-up exercises are recommended in the schools of New York State:

SETTING-UP EXERCISES (TWO-MINUTE DRILL)

FOR GRADES 3–8

(*At the sound of the bell, inspectors should open windows without command. Coats and sweaters should be removed.*)

Class: Stand! (*Face windows at once without command.*)

1. Breathing (four times):

In! (*Six counts for inhalation*).

Out! (*Four counts for exhalation*).

Right (left): Face!

2. Stretching (four times; *this exercise must be done to response commands, using the cues indicated*):

Bend! (*Bend trunk forward, touching hands to toes.*)

Shoulders! (*Stand erect, touching hands at sides of shoulders in passing to next position.*)

Stretch! (*Stretch arms upward, palms toward each other. Do not bend backward.*)

Higher! (*Make an effort to stretch higher.*)

Down! (*Turn hands and bring arms sidewise downward quickly, without noise. If the room is too crowded for the sidewise downward movement, the arms may be brought down close to the body.*)

3. Knee bending (eight times; *thumbs locked behind without command; this exercise should be taught, using the cues indicated; when it is thoroughly learned, it may be done to rhythmic commands*):

Down! (*Bend knees deeply.*)

Up! (*Stretch knees quickly.*)

Right (left): Face!

4. Breathing (four times):

In! (*Six counts for inhalation.*)

Out! (*Four counts for exhalation.*)

Remember

1. Poor posture is ugly; good posture is beautiful.
2. The Indian had splendid posture.
3. Good posture makes one healthy; poor posture develops ill health.

What other facts about health do you recall?

Health Habits

1. Stand tall. Sit tall.
2. Sleep on a low pillow.
3. Look up, not down, when you walk.
4. In standing distribute the weight equally on both feet.
5. In bending the body, bend at the waist.

Name other health habits.

Things to Do

1. Collect some pictures of good posture. Put them on the bulletin board.
2. Visit an art museum. Give a report on posture.
3. Get snapshots of all members of the class. Put the pictures into two groups according to the best and poorest postures. Do you need to improve your posture? How? Get snapshots later in the year to notice improvement.
4. Note the figures on page 44 showing posture. Indicate the points in good posture and in bad posture.
5. Appoint a committee to inspect the seats and desks to see that they are properly adjusted. The seat should be high enough so that the feet rest comfortably on the floor. The back rest should fit into the small of the back. The seat or chair should be close enough to the desk so that the pupil may

write without bending over. The desk should be high enough so that the pupil may write without bending over.

6. Write to the American Posture League, 1 Madison Avenue, New York, for information about good-posture pins.

7. Practice the setting-up exercises.

8. Have a good-posture parade.

9. Show your classmates the proper way to stand and to sit.

Review and Thought Questions

1. What were some of the reasons why the Indian had fine posture?

2. Why do artists prefer to portray people in good posture?

3. Why is the proper posture good for one's health?

4. Why will good posture make work easier?

5. What is the danger in carrying a heavy bag of books on the same arm all the time? Describe a better habit.

CHAPTER VII

HEALTH AND THE FEET

Baby's Feet are Beautiful. When a baby is born his feet are nearly always in excellent condition. It is only later that people are troubled with corns, bunions, calluses, and broken arches. About nine out of every ten persons suffer from some deformity or disorder of the feet that might have been prevented.

We are horrified at the way the Chinese once bound the feet of baby girls, making them cripples for life, yet here in America we wear such ill-fitting and improper shoes that it is the exceptional person who does not have foot trouble.

The American Indian seldom had any trouble with his feet, because he wore moccasins, which gave plenty of room for his feet. The civilized Indian who wears the white man's shoes also shares with him in having foot deformities. It is said that the early Egyptians had beautiful feet because they wore sandals, which they removed whenever they entered the house.

The foundation of all foot trouble which develops in later life is laid when one is less than twenty years old; so the kind of shoes that children wear is very important.

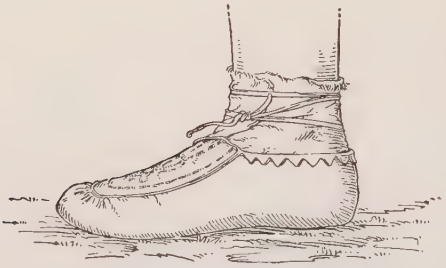
The Way the Human Foot is Made. The healthy, normal foot has twenty-six bones, which are arranged so that there is an arch under the instep. These bones, held together by muscles and ligaments, make the foot very flexible and elastic. At the same time the healthy foot is strong enough to bear the weight of the body. The strain upon the feet of man is much greater than it is on the feet of animals. The weight of the animal is distributed among four feet. Man has only two and finds it much more difficult to keep his balance.

EFFECT OF SHOES ON POSTURE

Improper shoes often cause bad posture. What story do these pictures tell?

The arch of the foot is very important. If it breaks down, the nerves and blood vessels underneath are injured. The breaking down of the arch often causes intense suffering. Not only is the pain acute but it may spread through the legs and to the back. One reason for the fallen arch is the weakening of the muscles and ligaments that maintain the arch. This weakness may

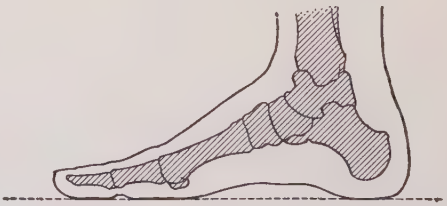
be due to a lack of exercise. Exercising the muscles that move the toes, if begun early enough, will sometimes prevent this condition.



AN INSURANCE AGAINST TROUBLE WITH THE FEET

Wear the Right Kind of Shoes. Most trouble with the feet comes from improper shoes. When buying shoes insist upon having this kind of shoe:

1. *Length.* The shoe should be so long that when you stand there is some space extending beyond the big toe. Colonel Munsen of the United States army says that when supporting the full weight of the body, as in walking, the foot is one inch longer than when the body is seated. The shoe which is too short causes pain and tends to crowd the big toe over on the little toes.



THE BONES OF THE FOOT, SHOWING THE ARCH

2. *Width.* The shoe should be wide enough for the toes to move around with ease. The foot is also wider when we stand than when we are sitting. The crowding of the toes will cause corns.

3. *Shape.* The shoe should have a straight inner line from toe to heel. The great toe should be able to point straight ahead. Shoes with pointed toes cause a deformity like that shown below. Bunions are also formed in this way. Do your shoes have the right shape?

4. *Heels.* Low, broad heels are best. High heels throw the weight of the body forward on the toes, pressing them uncomfortably into the toe of the shoe. Undue strain is brought to bear on the arch of the foot. Furthermore, in the effort to keep the bodily balance, bad and ugly habits of posture are often formed. Avoid high-heeled shoes if you would be free from foot trouble.

AN X-RAY PHOTOGRAPH SHOWING DEFORMED FEET CAUSED BY WEARING SHOES THAT WERE TOO SHORT AND TOO POINTED

5. *Kind of leather.* Patent leather is the most undesirable leather for shoes because the air cannot circulate through it. This causes the feet to perspire and feel very uncomfortable. Soft, porous leather is better.

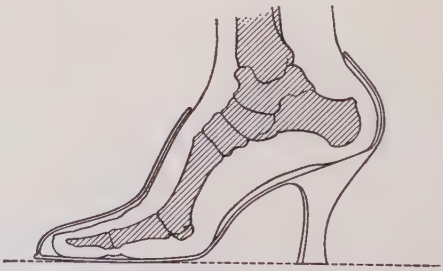
6. *Cut of shoe.* A low cut is desirable. It gives no support to the ankle and does not interfere with the cir-

culation. When the weather is wet and cold, woolen stockings or gaiters should be used for protection.

WHICH KIND OF SHOE WILL YOU WEAR FOR COMFORT AND HEALTH?

Even if we do live in civilized society we can have feet as good as the savage Indian if we wear only the right kind of shoes. This is especially important for children, since their feet are easily bent or pressed out of shape.

Walk with Toes Straight Ahead. The way we walk has a great deal to do with having good feet. On page 55 is shown the correct and the incorrect ways of pointing the toes in walking. Walking with the toes turned out puts the arch under great strain.

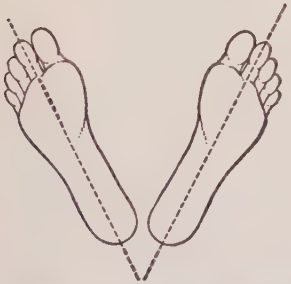


WOULD A WISE PERSON BUY THIS SHOE? Give reasons for your answer

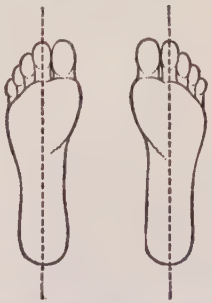
When the toes are pointed in the direction in which one is traveling (see the picture on page 55) the weight of the body falls forward and is distributed equally over the ball of the foot and the five toes. The weight is thus thrown

on the outer side of the foot, where it should be. Walking in this way reduces the strain and fatigue. How do you walk?

Exercises for the Feet. One reason why the ill-fitting and improper shoe is bad is that it does not give the muscles of the foot a chance to be exercised. Here are a



THE WRONG WAY TO POINT THE FEET IN WALKING



THE RIGHT WAY TO POINT THE FEET IN WALKING

few foot exercises for those who are threatened with a falling arch and for those who wish to avoid this defect:

1. Walk with the feet straight ahead, following a straight line, the heel and great toe touching the line.

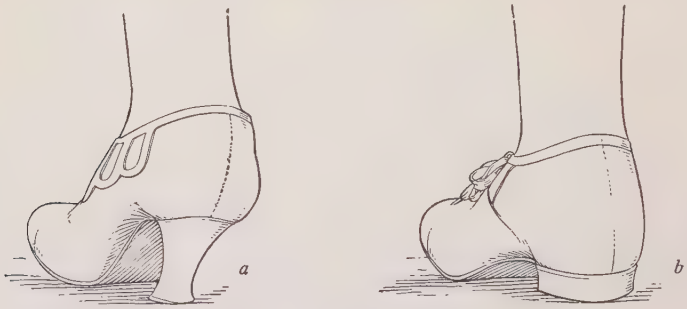
2. Lying with the feet parallel and apart, bend the feet downward and inward as far as possible twenty times.

3. Place the right leg over the left knee; bend the right foot downward and inward twenty times. Repeat for the left foot.

4. Toes are given us to grasp the ground. Use them for this.

Treatment of Corns and Ingrowing Nails. Corns usually result from wearing shoes that are too tight or too loose. Imperfections in socks, such as knots and rough darning, also help to make corns. Soft corns usually are found between the toes.

To get relief the first thing to do is to remove the pressure and friction. Sometimes this can be done simply by



WEAR A SENSIBLE SHOE!
Will you choose *a* or *b*? Why?

changing to the right kind of shoes. If the corn is on the sole of the foot a hollow ring pad placed so that the corn is in the center of the ring is usually effective.

Ingrowing nails are caused by wearing narrow-toed shoes. Ordinarily relief can be had by inserting a little pad of cotton between the nail and the flesh. Nails when cut should be square and should project beyond the soft flesh.

Broad-toed shoes must be worn.

Remember

1. Nearly everybody is born with perfect feet.

2. Trouble with the feet is almost always due to poorly fitting shoes.

3. Poor shoes often cause backache and much suffering. Frequently they are the cause of bad posture.

Write out other important facts you have learned from the study of this chapter.

Health Habits

1. Wear properly fitting shoes.

2. Wear shoes with low, broad heels.

3. Do not toe in nor out. Let the toes point straight ahead.

4. If you have serious trouble with your feet consult a foot specialist.

5. Wear stockings that fit the feet.

6. Air your shoes every night. They will fit better and be more comfortable.

Name other health habits relating to the feet.

Things to Do

1. Examine a baby's foot. Report on the shape. Does the large toe point straight ahead?

2. Look up some more facts about the binding of children's feet in China.

3. Have a school exhibition of hygienic and unhygienic shoes. Have an exhibit of pictures showing the same thing.

4. Make some health posters about shoes.

5. Practice each one of the exercises given on page 55.

6. Write a story about Mary Jane, who loved style and a small-looking foot better than comfort and health.

7. Find out what kind of shoes football players and mountain climbers wear.

8. Have a *shoe day* or *shoe week*. Put posters on the walls and in the halls telling about good shoes and the proper way to walk. Make tags to tag those who walk with toes straight ahead. What else can you do on this special day or week?

9. Study the pictures in this chapter showing the anatomy of the foot and tell all you can about them.

Review and Thought Questions

1. Is most trouble with the feet preventable? How?

2. Why is there more strain on the feet of man than on those of animals?

3. Describe a well-fitting shoe.

4. Why are patent-leather shoes undesirable? Is it a good plan to wear rubbers in the schoolroom? Explain.

5. What are the ill effects of wearing high-heeled shoes?

6. What is the cause of corns and bunions? How should they be treated?

7. How should one walk?

8. What are good exercises for the feet?

9. Why do babies and Indians have few foot troubles?

10. At about what age do you think the feet are spoiled? Why?

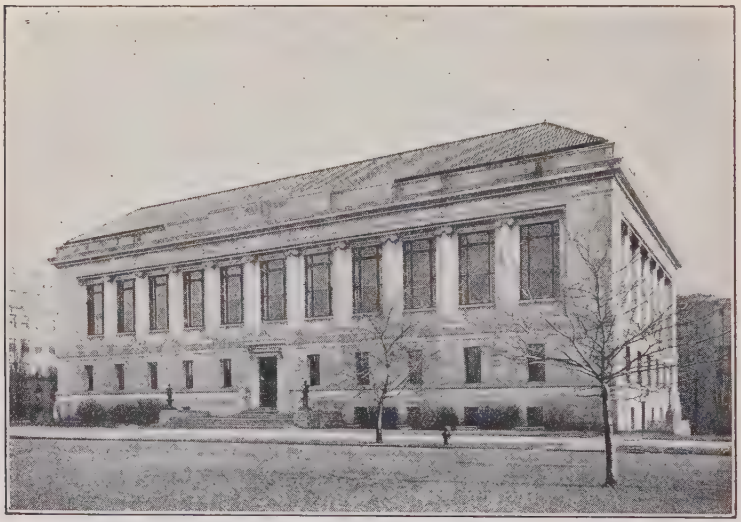
CHAPTER VIII

A HEALTHY MOUTH

The Forsyth Gift to Children. Not many years ago there lived in Boston four brothers by the names of James, George, John, and Thomas Forsyth. They were partners in a prosperous business, and they were interested not only in money but in doing good in the world.

One day when James was sitting in a dentist's chair he remarked that he wished to leave a half-million dollars to some public charity. The dentist, an old friend, suggested a dental infirmary for children. James Forsyth drew up a will to that end, but when he died the will was unsigned and therefore worthless. George had already died, and their wealth came to the two remaining brothers. John and Thomas Forsyth generously decided not only to carry out James's plan but to add to it. In memory of their brothers they built the Forsyth Dental Infirmary for Children at a cost of one million dollars. In addition they gave two million dollars for the expense of maintaining the infirmary. It is a building of uncommon beauty both inside and out. Here all children of Boston who are poor or in moderate circumstances may have their teeth treated without charge. In the year 1922 there were 86,105 cases treated.

The gift of the Forsyth Infirmary was a noble deed of citizenship, and the children of Boston have appreciated it. It is possible to go into many schoolrooms in Boston and not find a child who now needs dental work. When



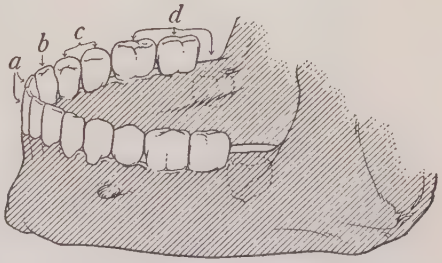
THE FORSYTH DENTAL INFIRMARY IN BOSTON
This institution is a noble gift to childhood

children are treated at the Forsyth Infirmary they are also encouraged to form good habits in caring for the teeth.

Importance of Good Teeth. Good teeth are desirable for beauty, health, and success. Many people would be very attractive if they did not have decayed or crooked teeth or faces sunk in because some teeth were missing. Sound, clean teeth are necessary for an attractive face.

Health is dependent upon good teeth to a much greater extent than many people know. We need teeth to chew our food so that it can be properly digested and used to build up the body and supply energy.

Good teeth are one of the essentials for successful living. It has been found that children with sound teeth have fewer absences from school and that in general they do better work.



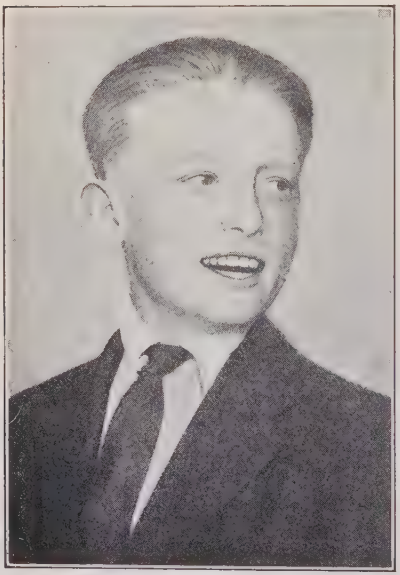
THE LOWER JAW, SHOWING THE PERMANENT TEETH

a, incisors; *b*, canine; *c*, bicuspids; *d*, molars; the last one, the wisdom tooth, is still concealed in the jaw

Improper Food One Cause of Tooth Decay. The greatest enemy of the teeth is decay. It is now known that rheumatism and heart trouble are sometimes a result of decayed teeth. Dental decay is so common in America that Dr. Dewit Cross says the teeth of 96 per cent of the children are defective. It was once thought that clean teeth do not decay. This is not true; for 96 per cent of the children who come from southern Europe have sound teeth, and most of them never knew what a toothbrush looked like until they entered an American school. This proves that the toothbrush does not make sound teeth.

Sound teeth depend first of all on having enough min-

eral material in the teeth to make them hard. A soft tooth will wear down and break off and become decayed sooner than a hard one. It is lime in the teeth which makes them hard. Even when the baby is born, although his teeth have not cut through the gums they are already formed. Whether they are going to be hard or not will depend on whether the mother ate foods rich in lime. Such foods are whole grains, coarsely ground, milk, leafy vegetables, and fruit.



A PERFECT SET OF TEETH

While the first set of teeth are pushing their way through the gums, the second set, or permanent teeth, are beginning to form. The kind of food the child has from the time he is born determines the hardness of the teeth. All prepared food for babies is much inferior to mother's milk. The older child needs to drink plenty of pure, rich cow's milk and eat leafy vegetables and fruits.

Lack of Care causes Tooth Decay. At the age of six the question of the hardness or softness of the permanent

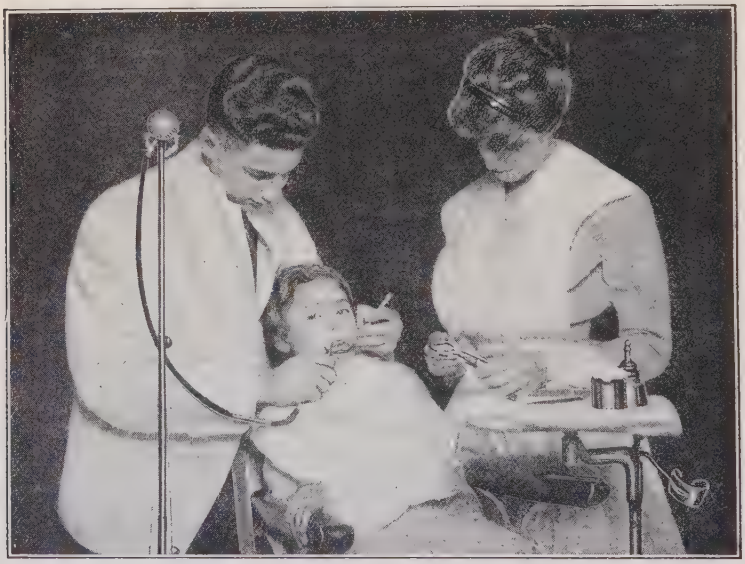
teeth has been settled for life. Little or nothing can be done to increase or decrease the hardness of the teeth. If teeth are sound and are kept clean it is probable that they will never decay. No matter how hard or how soft the teeth may be, proper care will help to preserve them.

UGLINESS IS CAUSED BY THE LOSS OF THE TEETH

Courtesy of Dr. Clinton C. Howard

One very bad habit of American children is that of eating too much candy and sugar. One reason why the children from southern Europe have fine teeth is because they eat very little sugar. They depend on milk and fruit for their sugar rather than on the sugar bowl. We know that sugar left in the mouth is changed into an acid which tends to dissolve the lime in the teeth so that bacteria can attack the teeth and cause them to decay.

Another cause of decay is the neglect of the milk teeth. Parents and children sometimes think that since these teeth are soon lost, it is not important to take care of them. They need to be taken care of because:



A SCHOOL DENTIST AT WORK

1. They are needed to chew the food that nourishes the body.

2. If they are lost, teeth of the second set may appear out of their proper place. Such teeth are not only ugly but tend to hold bits of food. This causes decay.

3. If they decay, they may cause toothache, which will be very painful and interfere with school work.

Visit the Dentist. Every child and adult should visit the dentist every six months or at least once a year. Teeth then can be filled so early that there need be no toothache. Also this will prevent the loss of the six-year molar. This tooth is the first of the second set to appear, and is often mistaken for a milk tooth. By consulting a dentist frequently irregularities of teeth and jaw may be prevented.

Home Care of the Teeth. One of the most important things to remember is to form the habit of keeping the teeth clean. Keeping the teeth clean helps to keep them from decaying. Clean teeth also make one more attractive.

The Massachusetts Department of Public Health offers these instructions on the care of the teeth:

Brush the teeth before breakfast, after each meal, and before going to bed.

Brush with warm water, using tooth powder or tooth paste at least once a day. Half a teaspoonful of salt in a glass of water also is good.

Brush at least two minutes each time, using an up-and-down stroke.

Brush the gums and roof of the mouth, as well as the teeth.

Brush the teeth carefully; then pass floss silk between them to remove any remaining food. Rinse the mouth well.

Brush should be rinsed well after using and kept for your personal use only.

Brush should be small and should never be used after it becomes soiled or matted.

Brush your teeth to save them.

Remember

1. Good teeth are the foundation of good health.
2. Good food in early childhood leads to good teeth.
3. Eating too much sugar, especially between meals, causes decay.

Write down other important facts from your reading of this chapter.

Health Habits

1. Keep the teeth clean.
2. Eat sugar sparingly.
3. Keep your teeth healthy by eating hard food like bread crusts.
4. Eat good foods like milk, leafy vegetables, and fruit.

Name other health habits relating to the teeth.

Things to Do

1. Tell to children of another grade the story of the Forsyth gift.
2. Examine each other's teeth to find out whether they are clean and sound.
3. Look at your own teeth in a mirror and name each one of your teeth with the help of the picture on page 61.
4. Post on your bulletin board pictures of people who show fine teeth.
5. Make some health posters on good teeth.
6. Give a two-minute talk to a lower grade on how to have good teeth.
7. Study the drawings of the teeth in this chapter and tell all you can about them.

Review and Thought Questions

1. Why were the Forsyth brothers good citizens?
2. Can you think of other men or women who have done something for the health of children?
3. Why is it important to have good teeth?
4. What causes the decay of teeth?
5. Why is it important to visit the dentist regularly?
6. What are you doing for the care of your own teeth?
7. Why is the six-year molar so important?
8. Why do children sometimes have irregular teeth?
9. How many permanent teeth do we have?
10. Which teeth are best adapted for cutting? for tearing? for grinding?
11. Will the use of the toothbrush alone prevent decay? Why not?
12. What is the relation between foods and good teeth?
13. What are the rules for home care of the teeth?

CHAPTER IX

HOW FOOD IS DIGESTED

The Body needs Food. From the very earliest times people have known that food was necessary for life and happiness. Driven by hunger savage man made spears and bows and arrows to kill his game, and set traps to decoy wild animals. He also learned to till the soil and to grow grains and vegetables. Wars have been fought for food. Cities have grown up because a good supply of food was near at hand. One reason why the Jews were anxious to push on into Palestine after being enslaved in Egypt was because it was reported to them that the new land was flowing with milk and honey. Today food is so important in our lives that a large part of the family income is spent for that purpose.

Although you may know how necessary food is you may not understand how food can be changed so that it can be used for running, jumping, playing, working, growing, and thinking. This changing of the food so that it can be used by the body is called digestion.

Digestion in the Mouth. The food must be dissolved so well that it can pass through a membrane into the blood. It is only in this way that the food can be used to furnish energy and build up the body.

The first step in the process of digestion is in the mouth. There the food is sliced by the sharp chisel-like teeth in front and ground between the uneven surfaces of the molar teeth. The tongue is very helpful in keeping the food between the teeth.

While the food is being ground, large quantities of a fluid called saliva are being poured through ducts upon the food. This saliva is manufactured by three different pairs of glands, found under the tongue, on each side of the lower jaw, and just below each ear. It is estimated that three pints of saliva are produced in a day.

The saliva moistens the food and aids the swallowing. It also changes some of the starch into sugar. Without this change the starch could not be used by the body, because starch will not pass through a membrane. Starchy foods do not remain in the mouth long enough for much of a change to take place; but this process continues for some time afterward in the stomach, and it is renewed and completed in the small intestine.

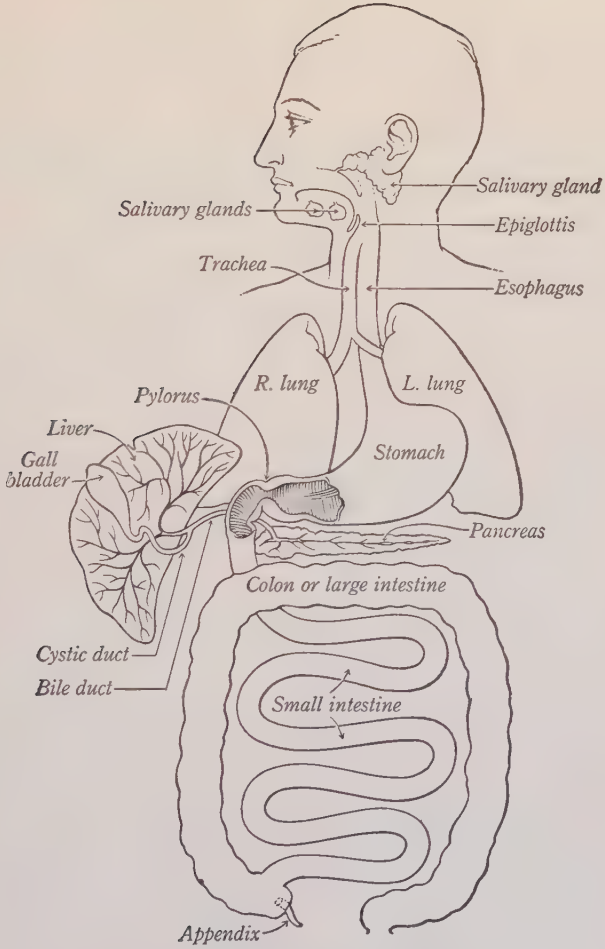
Swallowing. After the food has been chewed and mixed with saliva, it is forced up against the roof of the mouth by the tongue and moved backward to the opening into the throat. As soon as the food moves into the throat we no longer have any control over it. A lid called the epiglottis folds down over the air passage, and the food passes into the esophagus, which leads to the stomach. The food does not drop into the stomach but is pushed

along by traveling contractions of muscular bands. A movement of this kind is called peristalsis. Peristaltic movements take place also in the stomach and the intestines.

The Work of the Stomach. The stomach is a pear-shaped pouch with muscular walls. The pouch is larger where the food enters. Its important work is to store the food as fast as it is received and slowly force it along into the narrower part of the stomach called the antrum. The wall of the stomach is a strong set of muscles. As they contract, the food is mixed thoroughly with the gastric juice. This is an acid secretion from the walls of the stomach. The gastric juice acts chiefly on what is known as protein, a substance found abundantly in meats, eggs, and beans. The white of egg is almost all protein. Protein is dissolved by the gastric juice.

The Small Intestine. The work of breaking up the food and dissolving it so that it can be absorbed into the blood continues as the liquid food mass is forced from the stomach into the small intestine. The small intestine is a small tube about twenty feet long. Along this tube the food is forced by a traveling contraction of the walls of the intestine. As the food mass travels along, different digestive juices are poured upon it.

The Work of the Pancreas. The first of these juices is manufactured by the pancreas. This is an organ located along the lower curved border of the stomach. It is about



THE DIGESTIVE SYSTEM

Study this drawing as you read Chapter IX

seven inches long, half an inch thick, and an inch and a half broad. It secretes about a pint and a half of liquid each day.

Although the pancreas is a little organ, it is very important in the digestion of the food. The pancreatic juice has the power to dissolve and change all kinds of food. It completes the action of the saliva by changing starch into sugar. It completes the action of the gastric juice by breaking up the proteins. The pancreatic juice acts on the fats also.

The Intestinal Juice. Some of the cells found in the lining of the intestine secrete a fluid called the intestinal juice. The work of the intestinal juice is not very well understood, but it is believed to be the breaking up of the common sugars so that they can be absorbed into the blood, completing the digestion of proteins and stimulating the secretion of the pancreas.

The Bile. This digestive juice is secreted by the liver, the largest gland in the body. In a person of average size the liver may weigh three pounds. It is estimated that about one quarter of the blood in the body may be in the liver. The liver is always at work manufacturing bile. This fluid may be poured into the intestine or turned aside and stored in a pear-shaped sack called the gall bladder.

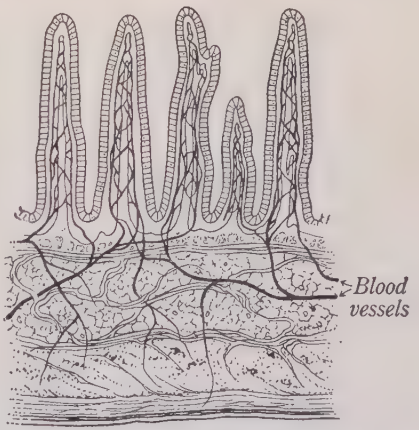
Bile is in part a waste product. It scarcely deserves to be called a digestive juice, since it does very little

by itself. It does seem to help the pancreatic juice in breaking up the fats, and it is also an aid to absorption.

THE SMALL INTESTINE IS ROUGH INSIDE

The main task of the liver is to work over the products of digestion absorbed from the intestines. It makes them safe and usable for the body.

Absorption in the Small Intestine. The work of the stomach is largely the breaking up of food into small particles and dissolving it so that it can finally be absorbed into, or made a part of, the blood. There is little absorption in the stomach.



THE VILLI OF THE SMALL INTESTINE HIGHLY MAGNIFIED

The small intestine is made for absorption as well as for digestion. An examination of the interior with the microscope shows that its inner surface is greatly increased by many cross folds. A further examination of the lining shows that it is covered with many fingerlike processes called villi. In this way there is the greatest possible surface for absorption. Each of the villi is filled with tiny blood vessels. As the food is

prepared for absorption it is taken up by these little blood vessels and is transported to the different parts of the body to be converted into muscle, fat, bone, or energy.

Work of the Colon. The large intestine, the colon, is about six feet in length. Its use to man is doubtful. There is no fresh addition of digestive juices in the colon, and most of the digestible elements of the food have been absorbed before reaching this area. The colon serves chiefly as a storage place for the waste products of digestion.

For the health of the body it is very important that this waste mass should be expelled with regularity. This elimination should occur at least once every day.

Drinking plenty of water, eating vegetables, fruits, and coarse breads, and taking plenty of exercise are all aids to elimination. They help to keep the body clean inside.

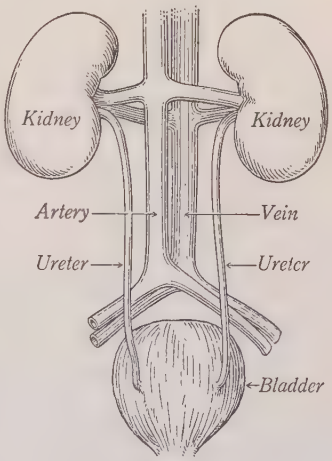
Fruits and vegetables are especially valuable because they contain a woody and indigestible substance called cellulose. This gives bulk to the contents of the intestine, which leads the walls of the intestine to contract so that elimination takes place.

Getting rid of Wastes. While much of the waste of the body is eliminated by way of the colon, there are three other ways of getting rid of wastes.

The skin is an organ of excretion. Through the perspiration it throws off salt and other waste materials. This is not the chief work of the skin; the body gets rid of

its wastes as effectively in winter, when there is little perspiration, as in summer. The principal task of the perspiration is to cool the body.

The lungs are essential for the removal of wastes. When the blood returns to the lungs after circulating through the tissues, it carries with it wastes from the cells. This waste is largely carbon dioxide. We shall learn more about the work of the lungs in a later chapter.



THE KIDNEYS REMOVE MANY WASTES FROM THE BODY

The fourth method of excretion is through the kidneys. These are two bean-shaped glands. They secrete from the blood a liquid called urine, which flows through ducts into the bladder, from which it is discharged. Salt, acid, and other wastes are removed in this way. To aid the kidneys in their work of excretion it is necessary for one to drink plenty of water.

Remember

1. Plenty of nourishing food is a necessity for healthy living.
2. Digestion changes the food so that it can be used.
3. Digestion begins in the mouth.
4. Saliva changes starch into sugar.

5. The digestive juices help to dissolve the food so that it can be absorbed.

Write out other facts worth remembering.

Health Habits

1. Chew your food thoroughly.
2. Eat slowly.
3. Eliminate wastes daily.
4. Drink plenty of water.
5. Eat coarse breads.
6. Eat vegetables and fruits.
7. Eat enough, but not too much.

Things to Do

1. Look over your family's household expenses for a week or a month to find out what percentage is spent for food.

2. Point out in the drawing on page 71 the organs of digestion mentioned in this chapter.

Review and Thought Questions

1. What work of digestion goes on in the mouth, and by what organs?

2. Explain how a circus performer can swallow water when he is standing on his head.

3. What is the work of the stomach? of the small intestine? of the pancreas? of the liver?

4. How is the structure of the stomach adapted to its work?

5. What is absorption? Where does it take place? How are the organs of digestion constructed to do this kind of work?

6. How does the body get rid of its wastes?

7. What are some of the aids to excretion?

CHAPTER X

EAT PLENTY OF NOURISHING FOOD

Food and Success. One of the principal requirements for successful living is plenty of good, nourishing food. Without such food the student, the athlete, the engineer, and the business man could not do their work. They need food for success as much as an engine requires good fuel. An engine burning coal which contains a large amount of slate, and insufficiently supplied even with that, cannot be expected to work satisfactorily. Food is needed to supply the body with energy and heat and to provide for growth and repair. The healthy working of both body and mind depends on good food. The child who begins the day with little or no food is at a serious disadvantage compared with the child who starts with a warm, nourishing breakfast.

During the World War food was the great necessity. If Germany through her submarines had been successful in cutting off the food supply of England, it would have meant a victory for Germany. Every nation in the war took the greatest pains to economize its food supply and provide the soldiers in the field and the workers at home with the right kinds of food.

Food as Fuel. Among the necessities of the human body are heat and energy. These are supplied by the food we eat. Most foods have fuel value. They are burned in the human body in a way that is difficult to understand and are thus turned into muscular and mental activity. The body cannot use coal and wood like an engine, but must use fuels which have been prepared by animals and plants. Plants change lifeless materials found in the air and soil into food. Animals also change the foods they eat, such as grass, hay, and grain, into foods for man. Milk is one of the best of these foods.

MILK AS FUEL

Dr. Bundesen, Health Commissioner of Chicago, pulled the lever which started this engine which burned dried milk. With this fuel the engine pulled a train carrying two hundred passengers a distance of ten miles. This proves that milk contains energy

In buying food for the kitchen stove or the furnace we usually speak of pounds and tons. Food may be sold by

weight, but when we try to measure food according to its fuel value we speak of calories. A calorie is the amount of food necessary to produce a certain amount of heat. Some kinds of food, such as lettuce, contain a good deal of bulk, but contain few calories as compared with an equal weight of cream. However, lettuce is desirable in the diet for other reasons.

The following table suggests amounts of food yielding one hundred calories:

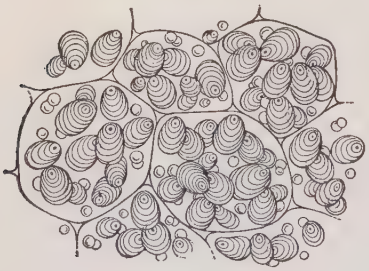
Two thin slices of bread.
One pat of butter (weight, about $\frac{1}{2}$ ounce).
One medium-sized apple.
One medium-sized banana.
One very large orange.
Three quarters of a cup of cooked oatmeal.
One cube of cheese measuring $1\frac{1}{2}$ inches.
Two tablespoonfuls of sugar.
Two small slices of bacon.
One small slice of roast beef.
One very large egg or one and a half medium-sized eggs.

Foods may be divided into these six different groups: (1) carbohydrates (sugars and starches), (2) fats, (3) proteins, (4) minerals, (5) water, (6) vitamins.

Starches and Sugars. These foods are especially valuable because they furnish so much energy. Starches and most of the sugars are found almost wholly in the vegetable kingdom. Milk sugar is an exception. Potatoes, peas, dry beans, tapioca, the products made of seeds and

grains, such as cereals, macaroni, and hominy, contain much starch. Honey, fruits, molasses, and candy are rich in sugar.

All starches, as we have learned, must be changed into sugar before they can be used by the body. When the sugar is absorbed into the blood it is used as a source of energy. Amounts not needed are stored in the liver and muscles and in bodily fat.



STARCH CELLS

A section of a potato showing particles of starch surrounded by cell walls of cellulose

Avoid the Vicious Candy and Sugar Habits. In the year 1923 the American people spent the huge sum of $390,000,000 for candy. This would buy about a billion pounds of candy. Although adults eat a good deal of candy, it is easy to believe that children ate a generous share of the amount, for too often children are found in company with a bag of candy, an "all-day" or "all-week" sucker, or other sweets.

It is true that candy is mostly sugar and that sugar is a food. It can be used by the body to produce heat and to furnish energy for work or play. Since sugars are quickly digested and absorbed they are readily available as energy. Although sugar and candy can be used as sources

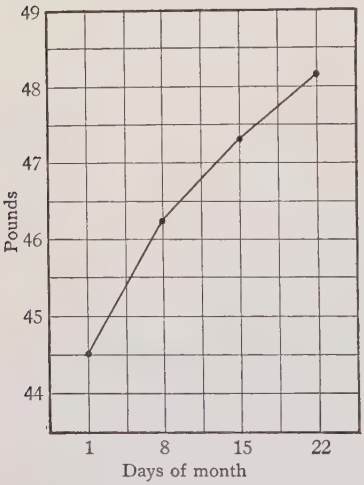
of bodily fuel, they are really not needed for such a purpose. One may live the regular length of life without ever having tasted sugar, as many of our grandparents were forced to do. Whole races of mankind have done without sugar or candy and suffered no harm.

It is true that the body does need a form of sugar called glucose for energy and heat; but the body may easily manufacture its glucose from the starch in bread, cereals, or potatoes or from the sugar in fruits, milk, and vegetables. There are many reasons why it is generally better for the body to make its own glucose from natural foods than to depend on candy or on the concentrated sugar of the sugar bowl. The best kind of sugar bowl is a basket of oranges, apples, grapes, and other fruit.

CANDY SPOILS THE APPETITE

The girl at the right is two years older than her sister on the left. She is only a half inch taller and is eight pounds lighter. She is not round and plump like her sister. The explanation is that she eats so many sweets between meals that she has no appetite for nourishing food at the table. (Courtesy of *Hygeia*)

While it is true that candy may supply energy, this is the *only* need that it can supply. It cannot build muscle or repair the body. It is distinctly lacking in the mineral salts needed for the bones and teeth. It has none of the vitamins necessary for growth and health. A meal of candy would supply energy but nothing else, whereas one made from whole-wheat bread and vegetables not only would supply the needed energy but would help supply the other needs of the body as well.



CHARLEY GAINS IN WEIGHT

As soon as Charley stopped the bad habit of eating candy between meals he began to gain rapidly in weight

It is only when candy is eaten in moderation at meals that it may rightfully be classed as a food, and then only when other necessary foods are consumed. Miss Lydia Roberts, a noted student of foods, says emphatically, "*The one condition under which candy serves a useful purpose is when eaten at meals in addition to the more essential foods and not in the place of them.*"

Probably the most serious effect that candy has on the growing child is that it lessens or sometimes even destroys

the appetite for milk, vegetables, and other important foods. The appetite is usually so dulled by sweets that children do not care for the milder-tasting foods like milk and vegetables. Instead they prefer other sweets.

As is well known by all dentists, candy and sugar are enemies of the teeth. They not only produce an acid in the mouth but they rob the teeth of materials which they need. Overindulgence in candy often may be responsible for acute indigestion, nervousness, fussiness about wholesome foods, and undernourishment.

The child or adult who is wise will eat candy in moderation and learn to spend his money for oranges, apples, and other fruits which contain not only sugar but other things that the body needs. All children would be better off if they ate no candy until they were at least six years old.

Many of the soft drinks served at the drug store are likely to upset the digestion and destroy the appetite for wholesome food.

Fats in the Diet. The fats are found chiefly in meats, cereals, nuts, butter, and milk. Fat is almost pure fuel. Not only is it valuable for its energy but it makes other food appetizing and aids in digestion. Fat stimulates the flow of the bile and pancreatic juice and aids in the elimination of waste products.

The fatty tissues of the body are built up largely from fats, sugars, and starches. Fat is a storehouse of energy.

A certain amount of it is necessary for an attractive appearance and to protect the organs of the body and hold them in place. Too much fatty tissue is always a burden. It means extra work for the heart and other organs.

© Keystone View Co.

AN ESKIMO MEAL

These people of the Far North need fat to supply warmth

The fat contained in milk, butter, and cream is best for children, especially young children. It is easily digested and contains substances necessary for their growth.

Protein, the Tissue-Forming Food. The body is constantly being worn out even while we sleep. The beating

of the heart and the breathing use up tissues of the living body. During the waking hours, when we work and play, this wearing out goes along very much faster. This loss must be replaced by food. New tissue must be formed for growth also. The only kinds of food that will form new tissues are those which contain protein. This is supplied liberally in the form of lean meat, eggs, milk, and cheese from the animal kingdom and beans, peas, cereals, and nuts from the vegetable kingdom.

A frequent mistake is to eat too much protein food rather than too little. After being digested, the excess is thrown off by the kidneys. The digestive organs and excretory organs are overtaxed.

Milk and eggs are the most valuable proteins for children. Every child should drink about a quart of milk a day. An adult needs a pint.

Meat is an expensive source of protein, but it is preferred by many because of its flavor and also because of the feeling of satisfaction that follows a meal. It is a wholesome food if not eaten in too large quantities.

Nuts are rich in protein and may take the place of meat. When they are eaten between meals, especially when they are not well chewed, they may cause indigestion. There will seldom be any difficulty if they are eaten moderately as the main dish of a meal. It is well to use them with the more bulky foods, such as vegetables and fruit.

Minerals. The teeth, bones, and blood need minerals —lime, iron, phosphorus, etc. Milk is very rich in lime. All the vegetables contain quantities of mineral material. Lettuce, spinach, carrots, and beans are valuable for their minerals.

YOUNG GARDENERS

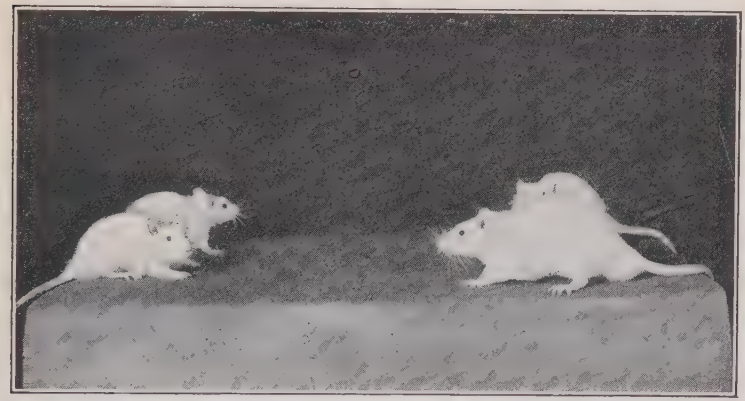
These boys and girls are anxious to help make the garden. Vegetables are necessary for health. (Courtesy of the Boston Tuberculosis Association)

Drink Plenty of Pure Water. Although water is not digested, it is necessary for the digestion of foods and for the health of the body. Over half the body is composed of water. Water makes up a large part of the blood and the digestive juices and is necessary for washing out the inside of the body and getting rid of wastes.

Children need to drink from four to six glasses of water every day. There is no harm in drinking it at mealtime if it is not used to wash down food.

The Vitamins. Until a few years ago it was believed that if the diet contained enough calories of fat, sugar,

starch, and protein and a sufficient amount of minerals and water, it was satisfactory for health. Recently it has been discovered that at least three other food elements, called vitamins, are necessary for health. These substances have not been separated from foods, and we know



WHICH BREAKFAST IS BETTER?

The rats on the left were fed buttered toast and coffee. Those on the right were fed oatmeal and milk. All are from the same litter. (Courtesy of the Battle Creek Sanitarium)

little about them except that they are found in certain foods. There are at least three known kinds of vitamins:

Fat-soluble *A* is dissolved in animal fats such as cream, butter, beef fat, egg yolk, and fish oils. There is little of it in vegetable oils. Glandular organs such as liver, and the leaves of sprouting vegetables such as asparagus, cabbage, celery, and lettuce, contain this vitamin. Fat-

soluble *A* is necessary for growth and to prevent rickets in young children. A liberal supply of it in the diet protects one also against tuberculosis and other diseases.

The second vitamin is water-soluble *B*. There is little danger of a deficiency of it in the diet because it is found to some extent in nearly all natural foods. It is not found in white flour, white rice, sugars, starch, or fats. People who live largely on polished rice are likely to have a disease called beriberi because they do not get enough of water-soluble *B* in their food. The chief sources of this vitamin are the seeds of plants, the eggs of animals, and cellular organs such as the liver and the brain. In peas and beans this vitamin is distributed through the whole seed; but in the grains it is found only in the germ and outer layer, both of which are removed in the milling of wheat. This is one of the reasons why whole-wheat bread is better than ordinary white bread.

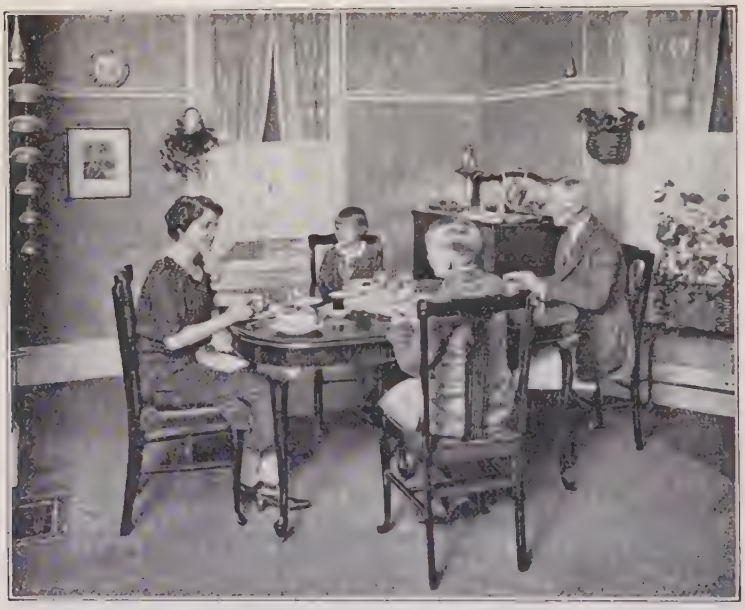
The third vitamin is called antiscorbutic *C*, because it will prevent or cure a disease known as scurvy. It is also necessary for growth. Its best sources are fresh vegetables and fruits. Cabbage, turnips, lettuce, water cress, lemons, oranges, raspberries, and tomatoes are especially well supplied with this vitamin. Since drying and heating are likely to diminish or destroy this vitamin, it is desirable to have fresh fruits and vegetables in the diet every day. One way to use fruits and vegetables is in salads. Dr. E. V. McCollum recommends two salads daily.

Since the ordinary mixed diet is likely to contain water-soluble *B*, the greatest need in the diet is to have some fresh fruit and vegetables and fat-soluble *A*. Our daily diet should contain whole milk, butter, cream, egg yolk, and leafy vegetables. Such food makes children grow.

AN ORCHARD SUPPLIES VALUABLE FOOD

A Balanced Diet. Care should be taken to have the daily diet balanced so that all the necessary food elements are included. Too frequently in the American home white bread, muscle meat, and potatoes are the principal foods. It has been proved that animals will not thrive on such a diet, but they will grow rapidly if this diet has milk, eggs,

leafy vegetables, and fruits added to it. If these are supplied plentifully in the diet, the natural appetite can usually be depended upon to supply all other essentials.



HAPPINESS HELPS DIGESTION

This family believes in making mealtime the happiest part of the day

In planning meals for children a good breakfast should be provided. This starts the day right. There should also be a substantial dinner. A simple supper is best. Some good samples of meals for boys and girls are given on the following page. Look them over carefully. Why are they good? Write out plans for a half-dozen meals.

BREAKFASTS

Orange	Baked apple	Stewed prunes
Rolled oats	Shredded wheat	Farina and milk
and milk	and milk	Bread and butter
Bread and butter	Poached egg on toast	Milk cocoa or
Milk	Milk	Milk

DINNERS

Pot roast of beef	Vegetable milk chowder	Rice and meat loaf
Potatoes—Spinach	(potato, carrot, onion,	Creamed carrots
Bread and butter	cabbage)	Bread and butter
Ice cream	Bread and peanut	Bread pudding
	butter	
	Dates	

SUPPERS

Rice and milk	Cream toast	Scrambled egg
Bread and butter	Apple sauce	Bread and butter
Baked bananas	Rolled-oat cookies	Molasses cookies
Milk	Milk	Apple sauce

The Cooking of Food. Most foods need to be cooked to make them palatable and digestible and also to kill bacteria.

Roasting, broiling, baking, and boiling are preferable to frying. The frying-pan often spoils food and produces fatty acids which irritate the stomach. After the boiling of vegetables much of the mineral matter and vitamins

are found in the cooking-water. This pot liquor is valuable food. One way of using it is in a meat-and-vegetable stew.

Remember

1. Nourishing food is the foundation of health and success.
2. There are six different groups of foods.
3. Most children eat too much sugar.

What other facts do you remember from the study of this chapter?

Health Habits

1. Start the day with a good breakfast.
2. Get up early enough so that you can eat your breakfast without hurrying or bolting your food.
3. Chew your food thoroughly.
4. If you eat candy, eat it in moderation and at the close of the meal.
5. Eat plenty of fruits.
6. Eat at least two other vegetables besides potato every day.
7. Drink at least one pint of milk daily.
8. Avoid tea and coffee.
9. Spend your money for fruit instead of buying drinks at the soda fountain.

What other good habits regarding food do you recall?

Things to Do

1. Make some health posters on food.
2. Plan your mother's meals for a week.

3. Plan a three-minute talk on some food topic.

4. Keep a record of what you eat at every meal for three days. Study the record carefully. Could your diet have been improved? How?

5. Make a health calendar with a health saying for every day.

6. Plan a basket lunch. Tell the class why you selected the foods that you did.

7. Find out where all our principal foods come from.

8. The American Child Health Association, 370 Seventh Avenue, New York, publishes a little book called "The Wisdom of Professor Happy." It is illustrated and filled with humorous and pithy sayings on health. Get a copy of this book (price, ten cents). Let the class write a similar book and furnish their own illustrations.

9. Make a study of the candy habits of three children. Report to the class.

10. Prepare a three-minute talk to the second grade on all-day suckers.

Review and Thought Questions

1. Why does the body need fuel?

2. How may foods be measured? Explain.

3. If lettuce contains only a few calories, why is it valuable in the diet?

4. What are the different groups of foods? What is the value of each?

5. Why is the candy habit injurious to health?

6. When should candy be eaten?

7. Why is the fruit habit better than the candy habit?

8. Why is water important?

9. What is meant by a balanced meal?

10. Why do foods usually need to be cooked?

11. Why should fried food be avoided?

12. Why should the evening meal usually be light?

13. What food supplies us with most of the starch we eat? with most of the fat? the protein? the lime? the fat-soluble *A*? the water-soluble *B*? the antiscorbutic vitamin *C*?

14. Do you think your candy and sugar habits are conducive to health? Give reasons for your answer.

CHAPTER XI

HEALTH AND THE DUCTLESS GLANDS

Museum Freaks. The man and woman in the picture on the next page are like persons you have seen in museums and side shows. If the woman walked down the street, she would tower high above the crowd. She is a giantess. The man is like the celebrated Tom Thumb of Barnum's circus. He is a dwarf. Both the man and the woman are the same age.

Many years ago we called such people freaks because we did not understand how they happened to grow that way. Now it is known that such peculiarities of body are due to the unusual action of certain ductless glands.

The Ductless Glands. The ordinary glands are little chemical laboratories that manufacture certain substances from the blood. The liver, which secretes bile, the sublingual gland under the tongue, which manufactures saliva, and the lachrymal gland, which produces tears, belong to this class. They have ducts through which they pour their secretions. Secretions flowing out through ducts are called external secretions.

The ductless glands pour their secretions (called internal secretions) back into the blood without the aid of

pipes. The secretions soak through the walls of the blood vessels. In some ways the ductless glands are even more important for health than the better-known glands.

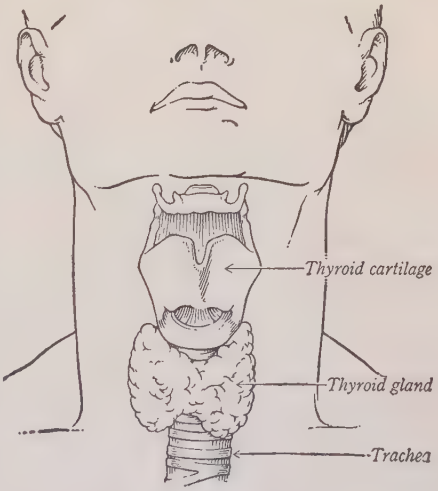
A GIANTESS AND A DWARF

The difference in size is caused by the unusual action of certain glands

Importance of the Thyroid Gland. The thyroid gland is situated on either side of the Adam's apple and is united by an isthmus over the windpipe. Unless the gland is enlarged, it cannot be seen or felt. The secretion of this gland contains iodine, which is needed for the proper nourishment of the brain and the health of the body in general. If there is enough iodine in the food and water, the thyroid remains healthy. When this is lacking, the thyroid must work so hard to manufacture thyroid secretion that the gland becomes enlarged. The enlarged gland is known as a tumor or goiter.

Children who have too little thyroid secretion are likely to develop a condition known as cretinism. Cretins are

short and stubby, do not grow, and have thick skins, thick tongues, and coarse hair. The worst of them are also idiotic. In certain mountain districts in Switzerland many of the children become cretins because there is so little iodine in the soil and water. Such children are often restored to health in a wonderful way by feeding them an extract made from the thyroid glands of sheep. They have been known to increase in height at the rate of half an inch in a short time.



THE THYROID GLAND

This picture shows one of the most important glands in the body

The thyroid also has to do with energy. It is like oil on a fire. When oil is poured on a fire, the flame burns brightly. Thyroid secretion makes the human flame burn fast and furiously. People with too much thyroid are quick, vivacious, nervous, do not sleep well, fidget, and generally are thin; people with too little are slow mentally and physically, like to sleep, and are heavy and unambitious, fat and lazy; those with just enough are bright

without being noisy, quick without being fidgety, and ambitious without being nervous.

Prevention of Goiter. Water and food containing iodine seem to prevent goiter. In Japan, where seaweed is used as a food, this trouble is almost unknown. Seaweed contains a large amount of iodine.

The government of Switzerland has had chocolate tablets containing iodine manufactured. A tablet is taken every week through the school year. In Cleveland, Ohio, in Grand Rapids, Michigan, in Hammond, Indiana, and in other cities similar tablets are used by the schools, or salt containing iodine is used. Some cities (Rochester, New York, for example) have treated their water supply with iodine in the spring and fall. Such measures prevent goiter and are desirable in those parts of the country where food and water supplies contain too little iodine.

Food which comes from the sea contains more iodine than that which grows on land.

The Adrenals. These tiny organs are found in the abdomen just above the kidneys. They secrete adrenalin. These organs are very important because they can furnish an impulse for the nerves which control the heart. Often in a surgical operation, when the heart is beating faintly and the patient seems to be in danger, an injection of adrenalin will produce the normal beating of the heart. People who have seemed to die are sometimes restored to life in this way.

Everybody has noticed how much stronger one appears to be when he is angry. This is because the adrenals become very active and pour their secretions rapidly into the blood. These cause the face to turn red and enable the individual to perform great feats of strength.

Other Important Glands. In the undersurface of the brain, within the skull, is a gland with a name hard to pronounce—the pituitary body. It is about the size of a pea. This gland seems to have much to do with growth, particularly with the growth of the bones, ligaments, and tendons. When through disease this gland becomes overactive, the bones of the hands, feet, and face become enlarged. The difference in the activity of the pituitary body accounts for the giantess and possibly for the dwarf in the picture on page 96.

The pineal is another ductless gland which is located within the skull. When it becomes diseased during youth, growth becomes very rapid. The body shoots up long, slender, and narrow. This is just the opposite of what happens when there is too little thyroid secretion.

The parathyroids are in the neck, just outside the thyroid. Their secretions seem to have something to do with the nervous control of the muscles. An animal in which these glands are removed or destroyed goes into convulsions at once.

A Service to Mankind. Since the very earliest times diabetes has been one of the dreaded diseases of mankind.

Those afflicted have large amounts of sugar in their blood. For some reason the body is unable to make use of this sugar. Diabetic patients often become very thin and listless. Diabetes is likely to be especially fatal to children.

DR. F. G. BANTING

One of the scientists who discovered insulin, which has saved so many lives

Relief from this disease was found at last in the brilliant discoveries of Dr. F. G. Banting and Prof. J. J. R. Macleod, of Canada. It was well known that most cases of diabetes were due to the failure of the pancreas to turn into the blood an internal secretion. Up to this time no practical method of separating it for use was known. These Canadian scientists discovered that when an extract made of those parts of the pancreas which manufactured the internal secretion was given to diabetic patients, they were able to eat ordinary sugar in moderation without harm. They speedily improved in health. The name of this new extract is called insulin. Its discovery is the result of long and patient effort.

This discovery gave hope to countless thousands of people. Dr. Banting and Professor Macleod received the Nobel prize in medicine, a sum of $40,000, in recognition of their services to mankind. Many other honors were showered upon them.

Remember

1. Ductless glands differ from ordinary glands in that they empty their secretions directly into the blood stream.

2. Many of these glands have something to do with growth.

Add other important facts found in this chapter.

Things to Do

1. Name as many of the ordinary glands as you can.

2. Name the ductless glands mentioned in this chapter.

3. Write to the health department of your state for information about the prevalence of goiter in your state. What steps are being taken to prevent it?

Review and Thought Questions

1. How does a ductless gland differ from an ordinary gland?

2. What is a goiter? What is its cause? How may it be prevented?

3. What is cretinism? How may it be helped?

4. How does the thyroid gland affect the energy of people?

5. Why are some people nervous and other people slow?

6. Why is a very much enraged child very strong?

7. How does the pituitary body affect growth?

8. Tell about the work of the adrenals and other glands.

9. What is diabetes? What is its cause?

CHAPTER XII

THE WORK OF THE BLOOD

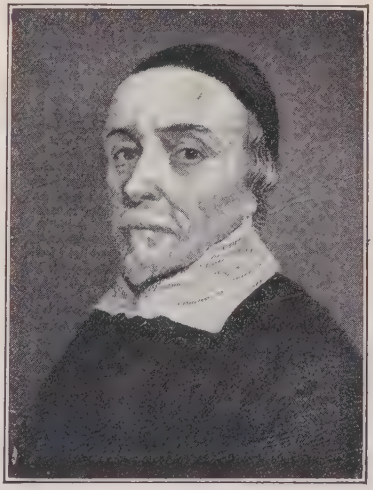
Harvey before the King. About three hundred years ago there was great excitement in the court of King Charles I of England. William Harvey, an English physician, was to appear before His Majesty and tell about a wonderful discovery that he had made. Before this time scientific men had curious theories about the blood. It was thought by many that some of the tubes which we now call blood vessels carried air instead of blood. Nobody had any notion that the blood in the human body flowed around the body. Harvey proved that "the movement of the blood is constantly in a circle, and is brought about by the beat of the heart." Harvey won fame as the discoverer of the circulation and was made physician to the king, although he was subjected to great ridicule and even persecution.

Since Harvey's time we have learned much more about the work of the blood and the circulation. Much of this new information has been made possible through the invention of the microscope.

The Cells depend on the Blood. There are billions and trillions of cells in the human body. If you could see

them all through the microscope and were able to count them, it would take so long that you would be old and gray before you had finished.

Each of these cells is alive and requires food and air for life and growth. They also need to dispose of their waste materials. It is by means of the blood that these many cells are able to do their work.



WILLIAM HARVEY

Harvey discovered the circulation of the blood

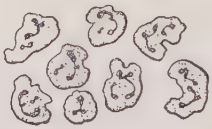
Study of the Blood. The blood looks red to the eye, but the liquid part of the blood is really colorless. In this colorless liquid, called the plasma, there are a great many little bodies called red corpuscles. They are so plentiful that they make the blood look red. Every red corpuscle has in it a substance called hæmoglobin, which readily absorbs oxygen, the most important part of the air we breathe. The red corpuscles are so numerous that it is estimated there would be about five million of them in a bit of blood occupying a space as large as a coarse grain of sugar. These corpuscles have their origin in the red marrow of the bones.

They might be thought of as little boats that have as their work the carrying of oxygen to the cells.

Besides the red corpuscles, there are a much smaller number of white corpuscles. These white corpuscles have a remarkable appetite for any foreign substances that get into the blood. They help to protect the body against disease.

The Heart. The principal force which sends the blood to different parts of the body is the heart. This is a

RED CORPUSCLES
They carry oxygen



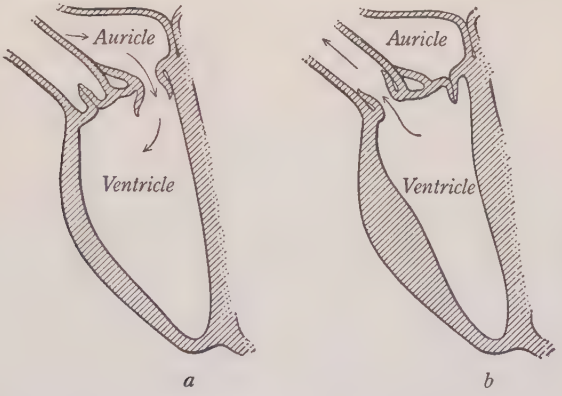
WHITE CORPUSCLES
They protect the body against disease

powerful muscle that works very much like a pump. It is about the size of the fist and is found beating between the fifth and sixth ribs.

The heart has four chambers. The two upper chambers are called the auricles, and the two lower ones the ventricles. The right side of the heart has nothing to do with the left side, but each auricle has a kind of doorway to the ventricle just below. When the auricles become filled with blood they contract and drive the blood into the ventricles. As the ventricles contract, some little flaps or doors called valves swing back to prevent the blood from

getting back into the auricles. The blood is then forced by the contracting ventricles into the blood vessels.

The blood on the left side of the heart is bright red because it is laden with oxygen. It passes out from the left ventricle into a large tube called the aorta, which



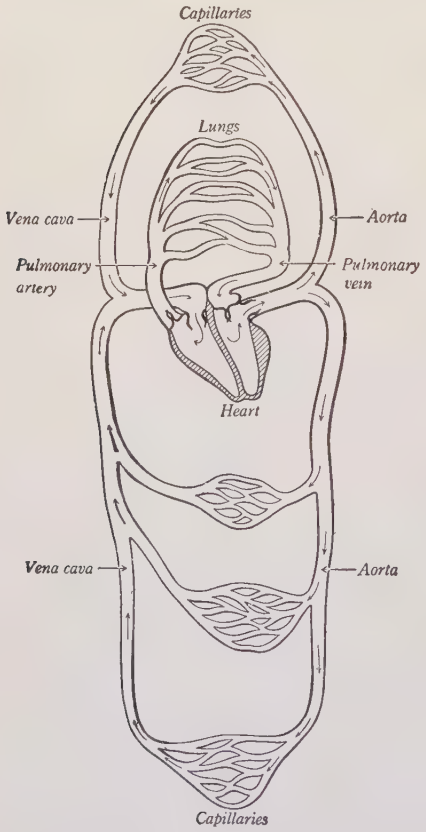
THE HEART IN ACTION

a, ventricle filling; *b*, ventricle contracting. Notice how the valves work

divides and subdivides into smaller tubes and carries the blood to every part of the body except the lungs.

The arteries—the tubes which carry the blood away from the heart—finally become such tiny tubes that they cannot be seen except with the aid of the microscope. These tiny tubes, called the capillaries, connect the arteries and the veins. They have very thin and delicate walls and are so small that they are not much wider than a single white corpuscle. It is while the blood is

circulating through the capillaries that it gives up much of its oxygen and changes to a dark blue. Strange as it may seem, Harvey knew nothing about the capillaries, although he did know that the blood passed in some way from the arteries into the veins. It was not until about forty years later that other scientists saw the capillaries under the microscope.



THE WAY BLOOD CIRCULATES

As the blood reaches the veins it flows along toward the heart, emptying into the right auricle, through large veins called the vena cava ascending and the vena cava descending. Passing from the right auricle into the right ventricle, it is then driven to the lungs through the pulmonary artery. In the lungs it relieves itself of poisonous wastes and takes on a load of oxy-

gen. From the lungs it is driven through the pulmonary vein to the left auricle and so completes the grand round of the body. It takes from twenty to thirty seconds for the whole mass of the blood to make this circuit. An adult has about twelve pints of blood.

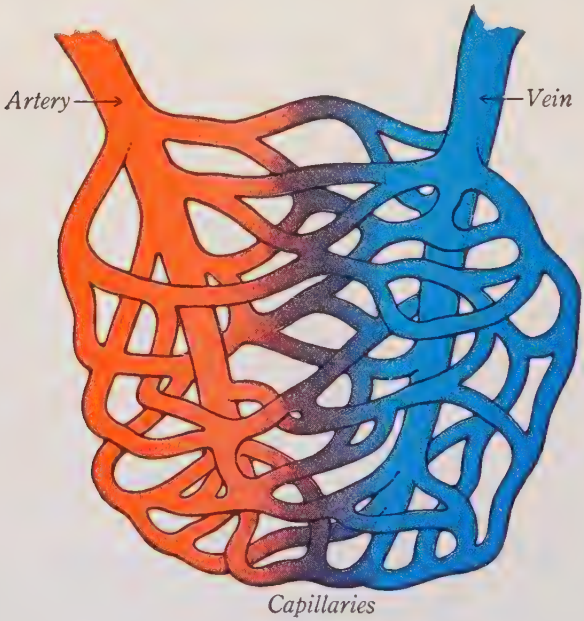
A Healthy Heart. Nothing is more necessary for happy and effective living than a healthy heart. It should be remembered that the heart is a muscle and requires exercise to keep in good condition. If it is not exercised and some strain is suddenly put upon it (running for a car, for example), it may be injured. Too little or too violent exercise of the heart is undesirable.

A SECTION OF A VEIN, SHOWING POCKET VALVES

It was once thought that "heart disease" was a trouble of old age only, but it is now known to be common in childhood. Most heart troubles have their beginning between the ages of two and six. Then the heart is growing most rapidly and is likely to be injured by various contagious diseases. Inflammatory conditions of the heart are likely to follow severe attacks of tonsillitis, scarlet fever, measles, and diphtheria. In the interests of a healthy heart it is especially desirable to avoid these diseases of childhood until the heart has nearly completed its growth.

The condition of the heart often can be told by the beating of the pulse. This is a regular expansion and

contraction of the arteries caused by the beating of the heart. Usually it is the pulse in the wrist that doctors count. The pulse beat in children is faster than in adults.

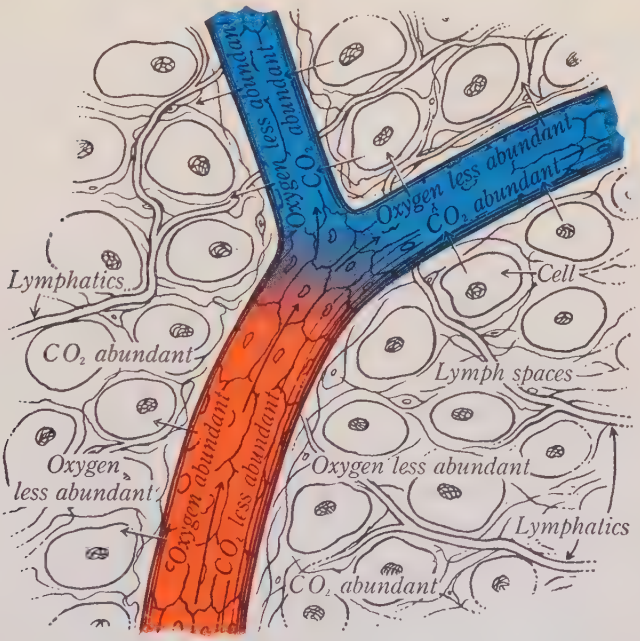


HOW CAPILLARIES ARE ARRANGED

These are tiny tubes connecting the arteries and the veins

Each Cell bathed in Lymph. Although the blood travels to every part of the body, it does not come in contact directly with the cells. The cells are found just outside the capillaries. They are held together by connective tissues. Between these cells and the connective

tissues there is space filled with a colorless liquid called the lymph. It is very much like the plasma of the blood



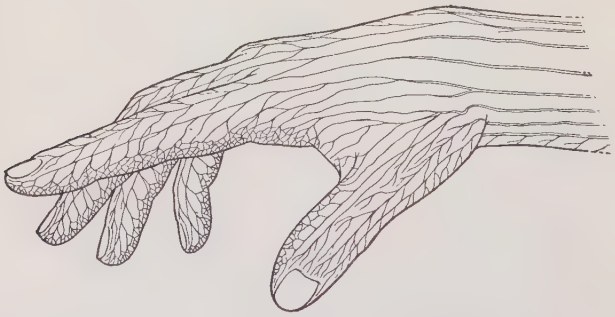
HOW THE BLOOD LOSES ITS OXYGEN

As the blood flows on, notice that the amount of oxygen decreases and the CO_2, or carbon dioxide, increases. What is happening among the cells?

except that it does not contain so much oxygen. It is around all the living cells. When we have a blister we can see lymph which has been squeezed out by injury to the flesh. The lymph collects in tiny tubes called lymphatics, that finally come together and empty into a large

vein in the neck. The great network of lymph tubes make up what is known as the lymphatic circulation.

How the Cells Live. To live and grow, the cells must be able to get food and oxygen and throw off waste material. A muscle could not work without oxygen. If it did not get food it would soon be worn out. The waste materials must be got rid of in some way if the cells are not



THE LYMPHATICS IN THE HAND

to be poisoned. The story of how this is brought about is one of the most interesting in the study of physiology.

In order that cells may do their work they absorb oxygen and other chemicals which they need through the thin-walled capillaries which surround them. The waste which results from the work of the cells is absorbed through the thin-walled capillaries by way of the lymph, a colorless liquid around the cells. One of these waste products is carbon dioxide. As the hæmoglobin loses oxygen to the cells and takes carbon dioxide from them,

the blood changes from a red color to a blue black. The waste which the blood picks up it carries to the lungs, kidneys, and other organs of excretion. These organs soon get rid of the poisons and wastes. This is necessary for health.

Remember

1. The cells of the body could not live or grow without the blood.

2. The blood carries food and oxygen to the cells.

3. The blood carries carbon dioxide and other poisons away from the cells.

4. The heart is a pump that forces the blood through the body.

5. Moderate exercise is good for the heart.

What other facts do you remember?

Health Habits

1. Exercise in the open air every day.

2. Keep away from children who have contagious diseases.

3. Eat vegetables. They contain iron, which is good for the blood. Meat, as well as vegetables, is rich in iron.

Things to Do

1. Get a beef or pig heart at the market. Dissect it with a sharp knife so as to show the auricles and ventricles.

2. Turn to the drawing of the circulation on page 106. Beginning with the left auricle, trace a drop of blood around the body.

3. Put some fresh water into a large glass and some salty water into a small glass. Stretch over the top of the smaller glass a thin, fresh animal membrane from the market. A piece of bladder carefully cleansed will do. Tie securely. Immerse the small glass in the larger one. After several hours taste the water in each glass. What has happened? Why is this process like that between the blood and the lymph?

4. Look up other facts about Harvey and his discovery of the circulation.

Review and Thought Questions

1. Who was Harvey? What great discovery did he make?

2. What are the cells? How do they depend on the blood for their existence?

3. Why is the heart like a pump? Describe its parts.

4. What are the differences between arteries, veins, and capillaries?

5. What is the lymph? What is the difference between blood vessels and lymph vessels?

6. What does the blood give up as it flows through the capillaries? What does it receive from the cells?

7. What causes heart disease?

8. What can we do to make the heart healthy?

9. Why are some children pale?

CHAPTER XIII

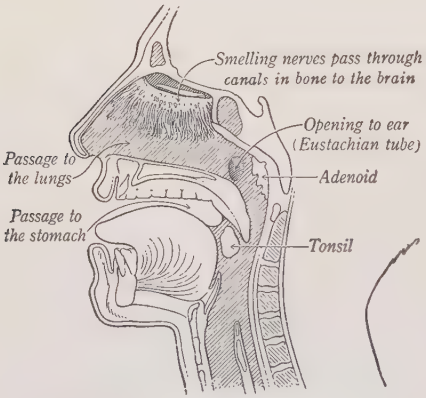
RESPIRATION AND VENTILATION

The Need of Air. Although air is not a food, it is just as necessary for life and health. It is possible to fast for many days without any serious effect, but we cannot do without air for more than a few minutes.

There are two gases that make up most of the air. They are nitrogen and oxygen. About one fifth of the air is oxygen, and the other four fifths nitrogen. Oxygen is the more important of the two. It has the peculiar power of uniting with other materials and producing heat and energy. This process is called oxidation. Oxidation is well illustrated in the case of a steam engine. The draft admits the air to the coal, which is oxidized or burned. The more draft the fire has, the faster it will burn. The oxygen, uniting with the coal, produces heat, which makes the steam that runs the machinery. If the draft is closed up tightly, so that no air can get to the burning coal, the fire will die out and the machinery will stop.

The body needs oxygen for life as much as an engine needs it for mechanical work. When we breathe the air into the lungs the oxygen is carried by the blood to the

tissues. There it unites with the tissues and makes life possible. This burning cannot be seen like a fire, but it is taking place in a way difficult to understand. Notice how warm the body gets during brisk exercise and how much more rapidly one breathes; the body is taking in larger quantities of oxygen. Without oxygen the heart and other organs could not do their work, and we should lose consciousness, for the brain cells require oxygen for thinking.


Smelling nerves pass through canals in bone to the brain
Opening to ear (Eustachian tube)
Passage to the lungs
Adenoid
Passage to the stomach
Tonsil

ADENOIDS AND ENLARGED TONSILS INTERFERE WITH BREATHING

The body is also like an engine in having a waste product called carbon dioxide gas. This is found in the smoke of the fire. In the human body it is thrown off every time we breathe out air. The amount of carbon dioxide is insignificant: in the air ordinarily there is only four one hundredths of 1 per cent; in the air breathed out there is about 4 per cent.

Breathing through the Nose. Air may pass to the lungs through the nose or through the mouth. The nose only is adapted to breathing. The nasal passages occupy a large space in the skull and are extensively subdivided.

Projections from the walls jut out into the passages, so that there is a much larger surface than might be expected. The lining of the nose is well supplied with blood vessels which warm the air before it can be taken to the lungs. The mucous membrane lining the nose also secretes moisture, which is taken up by the air breathed in, especially if the air is dry. The nose has also many hairs which filter out dust. The nose is much better prepared than the mouth to filter, moisten, and warm the air and so to protect the lungs from irritation.

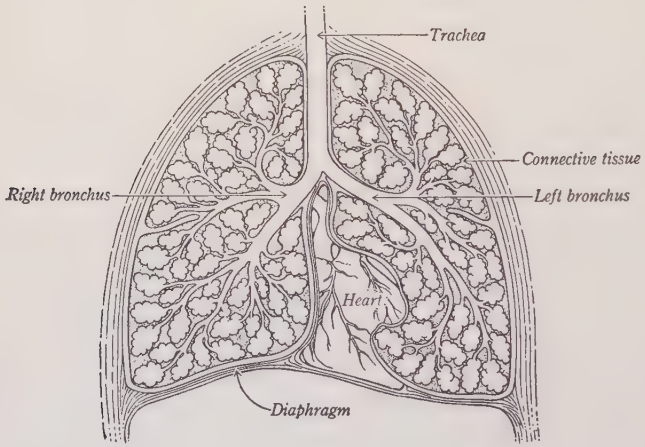
There are other ill effects of mouth-breathing. When the mouth-breather is eating, he is likely to swallow his food before it has been well chewed because of the need for breathing. The mucous membrane of the mouth when used for breathing is likely to become dry and cause discomfort. Chronic colds and catarrh are apt to result. The mouth-breather is also apt to have a badly shaped face. The lower jaw may recede, the upper jaw project, and the nostrils be undeveloped. If the nasal passages become clogged, the voice usually lacks clearness.

One of the principal causes of mouth-breathing is a growth in the back part of the nose, or pharynx, called adenoids. When these seriously obstruct the breathing they should be removed.

Any inflammation of the throat may cause deafness, because the irritation may spread to the inner ear through

the Eustachian tube, which connects the throat with the middle ear. Find this tube in the drawing on page 114.

The Work of the Lungs. In breathing, the air is drawn through the nose and the windpipe, or trachea, into the lungs. The trachea begins at the back of the mouth. It

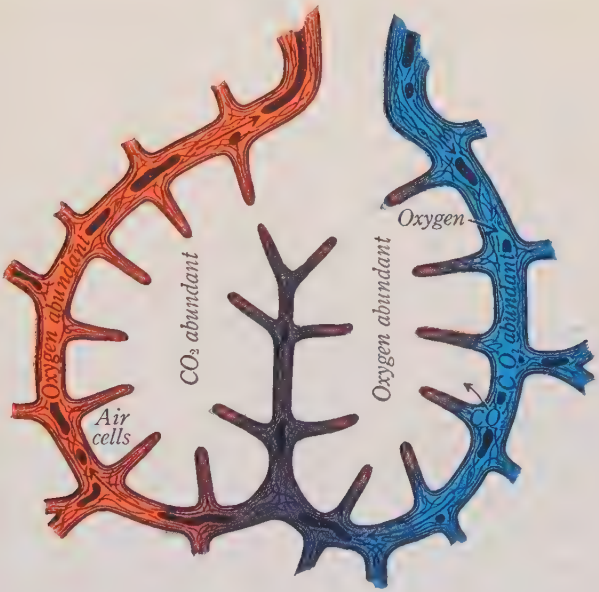


THE LUNGS

Notice how the trachea divides and subdivides into smaller tubes which finally end in air sacs

is kept open by bands of cartilage embedded in its tissues. The trachea divides into two parts, the right and left bronchi, each leading into one of the lungs. These bronchi divide and subdivide into smaller tubes which finally end in air cells so small that they can be seen only under the microscope. In the walls of these air cells are a vast number of capillaries.

When the blood, heavily laden with carbon dioxide and other wastes, is pumped into the lungs by the right auricle, it is distributed through all these capillaries, that are

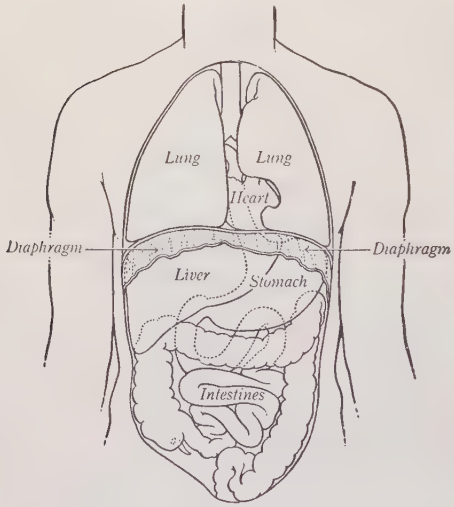


AIR CELLS IN THE LUNGS

Notice how the blood as it flows through the lungs gets oxygen and loses its carbon dioxide

separated from air in the air cells only by very fragile membranes. The blue-black blood loses its wastes, which pass through into the air sac, while the oxygen in the sac finds its way into the blood. As the blood flows on and loses its impurities, it flows bright red back to the heart.

The larger air passages are usually provided with little hairlike projections, the cilia, which move back and forth. They move more strongly toward the mouth and nose than in any other direction and so protect the lungs against dust, other forms of irritation, and infection.



THE THORAX AND ABDOMEN, SHOWING THE DIAPHRAGM

An inflammatory condition affecting the nose and throat is called a common cold. If it reaches the bronchi, it is called bronchitis; if it gets into the air cells of the lungs, it is called pneumonia.

The Story of how we Breathe. The complete process of breathing is called respiration. Drawing the air into the lungs is known as inspiration and breathing it out as expiration. We never entirely empty the lungs of air.

The mechanism for respiration is one of the most interesting in the human body. The lungs have no muscular tissue, and yet they become inflated. How is this accomplished? The walls of the chest cavity are supported by

ribs which slope downward. They are fastened in front to the breastbone, and at the back to the backbone. At the bottom of the chest, separating it from the abdomen, is a large dome-shaped muscle called the diaphragm. At the time when the ribs are being lifted, the diaphragm contracts, making the space even larger. When this happens, the air rushes in to fill the lungs. This is inspiration. The air is not pulled into the lungs, but rushes in when the chest is enlarged. Although we may not be aware of it, the air is pressing in upon us all the time. It surrounds the world to a depth of forty or fifty miles. It is this pressure which forces the air into the lungs.

Expiration is just the opposite of the process just described. The ribs fall, and the diaphragm again assumes its domelike appearance, forcing the air out of the lungs.

The process of breathing is carried on usually in an unconscious way.

While deep-breathing exercises are unnecessary, full, deep breathing is desirable. Clothing and posture should be such that breathing may be free. Stoop shoulders and tight clothing that hampers the chest or waist interfere with natural breathing. Habits of vigorous exercise in the open air, such as running, swimming, hiking, and outdoor games, are more important for lung development than any kind of special breathing exercise.

Tonsils and Adenoids. The tonsils are two prominent glands located on each side of the throat. They are readily

seen by examining the throat after depressing the tongue. The work of the tonsils is to filter out germs of infection that would otherwise enter the blood stream. Sometimes the tonsils themselves become diseased and endanger the

IT PAYS TO BREATHE THROUGH THE NOSE

The picture at the left shows how mouth-breathing, caused by adenoids, affects the appearance; the picture at the right shows the same girl after the removal of adenoids and the straightening of the teeth. (Courtesy of Dr. H. L. Howe

health of the rest of the body. Diseased tonsils often make breathing difficult, interfere with the speech, and make swallowing painful. They are a frequent cause of colds and sore throat and are now known to cause acute rheumatism and heart disease. Diseased tonsils are always a menace to health, scholarship, and success. The

removal of diseased tonsils usually results in greatly improved breathing and better health generally.

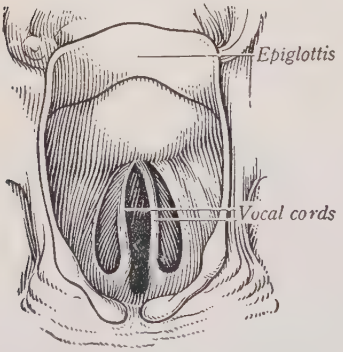
Behind the soft palate, where the nose opens into the pharynx, there is another tonsillar structure, called the adenoid. Like the tonsils in the throat, it may become greatly enlarged and diseased. It may form a mass large enough to fill the space behind the nose and so prevent normal breathing. When this mass becomes enlarged and diseased, it is known as "adenoids." These may cause a deformity of the bones of the face and the arching of the roof of the mouth. Adenoids are frequently the cause of colds in the head, deafness, mouth-breathing, stammering, sleeplessness, and nervousness. When such symptoms are present a physician should be consulted. The removal of adenoids usually brings marked relief and improvement.

Both diseased tonsils and adenoids prevent children from making normal gains in weight and frequently are a cause of malnutrition.

The Hygiene of the Voice. The voice is produced by the vibration of two bands in the larynx, called the vocal cords. The larynx is a box composed mostly of cartilage, that is very prominent in the throat and is often called the Adam's apple. In ordinary breathing there is no loud sound because the cords are relaxed. When we speak, the cords become tight and the air passing over them produces a sound. The lips, teeth, tongue, and palate change these sounds in such a way that letters and words are

pronounced. The open sounds such as *a*, *e*, *i*, *o*, *u*, and sometimes *w* and *y* are called vowels. The other letters are consonants.

A clear, melodious, and refined voice is very agreeable and can be cultivated. Nearly all children have sweet voices, but often the sweet tone is lost because of nervous habits and neglect of health. To have a good voice remember these things:



VOCAL CORDS SEEN FROM ABOVE

1. Try to speak clearly and distinctly.
2. When hoarse do not use the voice more than is necessary.
3. Avoid colds.
4. Avoid smoking. The hot, poisonous smoke may injure the throat and the vocal cords.
5. Avoid straining the voice.

Ventilation. Everybody has noticed that when air has not been changed in a room it seems "stuffy." It was once thought that such air contained a large amount of carbon dioxide. It has been proved, however, that bad air is caused only in small part by this and other poisons set free by breathing. Discomfort in any room is due rather to overheating, lack of moisture in the air, and lack of movement of the air. Odors in badly ventilated places are due not to the breath alone but to lights, clothing, perspiration, etc.

In a well-ventilated room the air will have

1. *A temperature of about 68 degrees.* A room in which the temperature drops more than two or three degrees below this is likely to chill the body and lead to colds. If

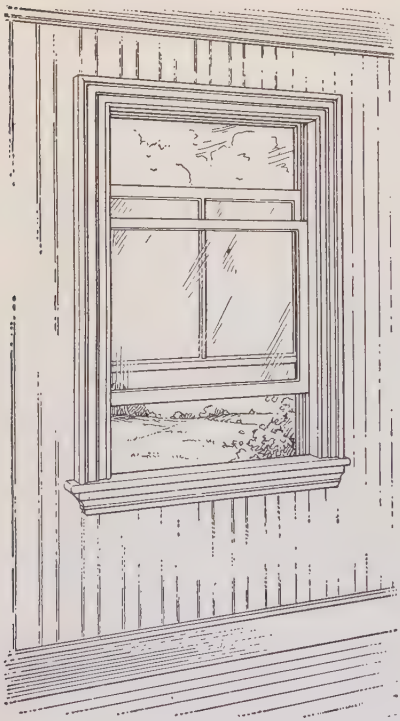
AN OPEN-AIR SCHOOLROOM

Open-air rooms make sick children well. They also help to keep well children healthy

it goes much above this, marked discomfort will result, making it difficult for one to do mental or physical work.

2. *Moisture about equal to out-of-door air.* One of the great evils of indoor air is its dryness during the time that heating is required. Dry air, such as is found in many schoolrooms and homes, absorbs the moisture of

the nose and air passages, leading to discomfort and colds. The drying of the skin makes the body feel cool, so that a higher temperature is demanded than health requires. The ideal kind of air would have the same degree of moisture that it has out of doors.

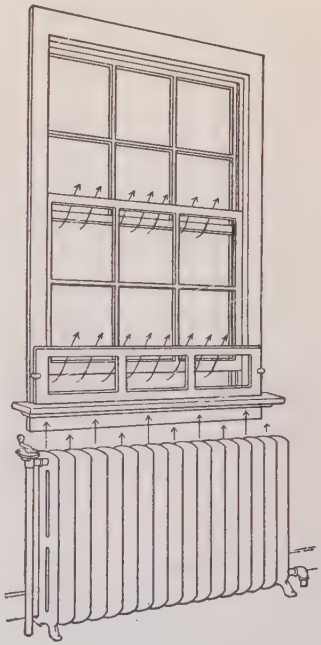


FOR GOOD VENTILATION OPEN THE WINDOW AT BOTH TOP AND BOTTOM

One way of increasing the moisture, or humidity, of the air is to have as much open-window ventilation as possible. Potted plants also add moisture to the air. Pans of water placed where the water can evaporate will help.

3. *Movement.* It is well to avoid both drafts and stagnation of the air. Dead air, especially when it is overheated, may be very oppressive. Under such conditions opening the windows or starting an electric fan will bring immediate relief. This is because the moving air removes the heat from the body.

Window Ventilation. One of the best ways to secure a circulation of the air is to open windows. Many people do not know how to do this. Since warm air rises, the top of the window should be lowered to let it out. The bottom of the window should be raised to admit the fresh, cool air. To prevent its blowing directly on anybody, windows should be opened on that side of the house where the wind does not blow. A ventilator, as shown in the picture, makes ventilation easier.



THIS METHOD OF VENTILATION PREVENTS DRAFTS AND WARMS THE INCOMING AIR

Airing out the schoolroom during the recess period will make the room much more comfortable for work.

Sunshine is a Necessity. Everybody needs sunshine for healthy living. We have long known that plants needed it for growth, but the discovery was made recently that the human body needs it, too. It is now known that rickets is a disease due directly to lack of sunshine. This explains why there are so many cases of rickets among babies at the end of the winter;

that is the time when babies are kept indoors a good deal. In the tropics, where there is an abundance of sunshine throughout the year, rickets is practically unknown.

Scientists have proved that one of the rays in sunlight called the ultra-violet ray is responsible for the effect of sunlight on growth and health. Taking cod-liver oil is now known to have the same effect as sunlight. As a result of scientific study it has been discovered that foods exposed to the direct rays of the sun have some of the same properties as sunlight itself.

It is still largely a mystery as to just how the sunshine does its work, but there is no difference of opinion among physicians as to the value of sunshine. Ordinary glass shuts out the ultra-violet rays, so that boys and girls should try to get their sunshine by playing out of doors as much as possible.

Remember

1. Air is as necessary as food.
2. Sunshine is necessary for health.
3. Good posture helps one to breathe.

What other facts in this chapter need to be remembered?

Health Habits

1. Breathe through the nose.
2. Stand and sit tall.
3. Use your voice without undue strain.

4. Keep the temperature in the schoolroom at 68 degrees. Name other health habits.

Things to Do

1. Light a candle and put it in a glass jar. Put the cover on. What happens? Why? Remove the cover. What happens? Why?

2. Punch holes in the top and bottom of a tin can. Put a lighted candle into it. What happens? Why?

3. Find out how the currents of air move in your room. Light a joss stick. Move it to different parts of the room. Test currents near the ceiling and those near the floor. Is the air moving so that pupils get a change of air? Experiment by opening and closing different windows at the top and bottom. Make drawings showing the air currents.

4. Find out how a fish breathes; an insect; a tadpole; a frog.

5. Study the heating and ventilating system of your school. Describe how it works.

6. Visit a high-grade poultry farm or other place where animals are kept. Report on the subject of ventilation.

7. Find out all you can about the Black Hole of Calcutta. After reviewing the facts of this chapter, try to explain what happened to the English prisoners.

8. Secure two potted plants. Wrap one of the plants with sheet rubber and tie it tightly around the stem. Be careful not to injure the stem. Do not wrap the other plant. Put both of them in the sun. Weigh them at intervals of an hour for several days. What is your conclusion?

9. Study the drawings and diagrams of the breathing-apparatus. Explain from them the process of respiration.

Review and Thought Questions

1. What important gases are in the air?
2. Which is the more important? Why?
3. What is the relation of oxygen to the production of energy and to nutrition?
4. What are the advantages of breathing through the nose?
5. What are the effects of mouth-breathing?
6. Why are adenoids injurious?
7. Do colds ever affect the hearing? How?
8. What is respiration? How is it carried out?
9. Do clothes and posture have anything to do with correct breathing? Explain.
10. What are the essentials of good heating and ventilating?
11. What care should be taken of the voice?
12. Is your schoolroom well ventilated? Explain.
13. Why do aviators flying at great heights take oxygen tanks?
14. Why does carbon dioxide in air cause us to breathe deeply?

CHAPTER XIV

LEARNING TO BE ATTRACTIVE

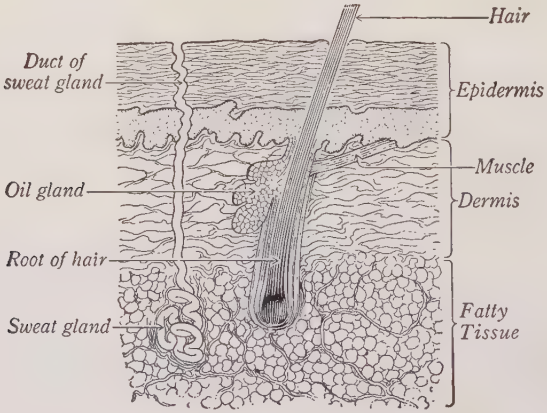
Everybody's Desire. Everyone has a natural wish to be attractive rather than ugly and repulsive. While some persons are born better-looking than others, yet they may treat their bodies and minds so badly that they become quite ugly and unattractive. Having refined manners and doing noble deeds help to make one attractive. Certainly good health improves one's appearance. The practice of the rules of health is a step toward strength, power, and beauty.

The improvement of one's appearance depends on one's dress and to a very large extent on the proper care of the skin, hair, and nails.

The Work of the Skin. The skin is a close-fitting garment around the entire body. There are two layers—the epidermis, or outer layer, and the dermis, or inner layer.

The epidermis is made up of a mass of cells held together by a cementlike substance. Those cells near the surface are hard and flat, whereas those next to the dermis are round and soft. In the lowest layers there is a kind of coloring matter which makes the difference between those who have dark complexions and those who have

light complexions. This coloring matter becomes darker in the summer and protects the body against the bright rays of the sun. Then one is said to be tanned. The epidermis has neither nerves nor blood vessels and is insensitive to pain. Its work is largely that of protecting the more delicate dermis and the tender flesh underneath.



SECTION OF SKIN SHOWING HAIR AND GLANDS

The dermis is made up mostly of fibers. It is this part of the skin of an animal that is tanned for leather. The outer surface of the dermis is rough because of little projections called papillæ. These papillæ do not show plainly on the surface of the skin, but in the palm of the hand they are crowded into rows. Their position is indicated by the tiny ridges which can be clearly seen on the palm and the tips of the fingers with a magnifying glass. Within

the papillæ are found the ends of nerves and loops of blood vessels called capillaries. The blood vessels of the skin nourish the cells.

There are two kinds of glands in the skin: the sweat glands, or perspiratory glands, and the oil glands, or sebaceous glands. The sweat glands pour out a salty, watery secretion on the surface of the skin through tiny ducts. This sweat, or perspiration, appears in drops when the body is too warm. It is estimated that there are between two and three million sweat glands in the skin. The total length of all these glands is eight miles.

The oil glands open into little pits from which the hairs grow. A few open directly on the surface of the skin. This oil keeps the skin soft and prevents it from drying and cracking.

A Clear, Healthy Skin. The healthy skin is clear, has good color, and is moist and smooth. The lips are naturally red. If the skin is not in this condition, it is a pretty certain sign that it is not being properly cared for or that one's health is not normal.

To have a healthy skin one must first practice those habits that are essential for the health of the entire body. This means proper nourishment—the eating of plenty of good, nourishing food like milk, eggs, fruit, and vegetables. It means also the proper elimination of bodily wastes; it means drinking plenty of water; it means sleep, rest, and exercise in the open air.

Cleanliness is another essential for a good complexion. Bathing removes the remains of perspiration, excess oil, and rough, loose scales. For a good complexion the face should be washed at least twice every day. Cold water is better than warm water in that it gives the fibers of the skin firmness, but it is less cleansing. It also prevents the chapping and roughening of the skin and stimulates the circulation of the blood. Blackheads on the face are caused by the clogging of the oil glands, which are very numerous on the face. They indicate a lazy kind of skin that because of lack of cleanliness or exercise is not doing its proper work.

The warm bath is desirable for cleanliness and should be taken at least once every week. The cold bath is stimulating, makes the skin less sensitive to cold, and gives one a sense of well-being. The best time to take a cold bath is before breakfast. If this practice is started in summer, it will be easy to carry it on through the winter. The shower bath is best; but nobody need go without a bath, for all that is necessary is a sponge and a basin of water. Rubbing the body thoroughly with a coarse towel until the skin feels warm should not be neglected after a cold bath.

A Good Complexion cannot be Bought. Those who are healthy and have good complexions seldom use powder or paint. Often those who are not healthy resort to the drug store for cosmetics and powder. Such beauty is, of course,

only "skin deep" and washes off. While some of the drugs are harmless, some are likely to be injurious. Health cannot be bought. Somebody in a joking way has said that the only thing to do with a rouge pot is to carry it out one mile from home and bury it; then go out every day and

© Keystone View Co.

HIKING IS GOOD FOR THE COMPLEXION

uncover it to see whether it is still there, and walk back. Such exercise is pretty certain to improve one's color.

Nothing can take the place of healthful habits. Walking in the snow, fog, and rain is especially beneficial to the complexion because cold moisture beating on the skin makes the cheeks pink. Walking two miles every day is an excellent practice.

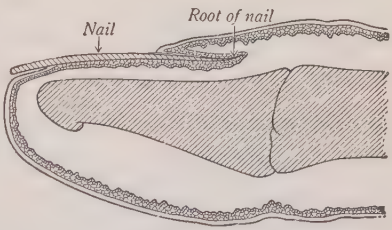
The Care of the Hair. The hair is composed of columns of epithelial cells that grow out of a depression in the skin. The hair grows from below the epidermis, and none of it which appears above the skin is alive. It is easy, therefore, to understand that cutting, shaving, or singeing the hair has no effect on its growth. The oil glands keep the hair oily and prevent its breaking. The amount of oil poured out on the scalp differs in different people. Some scalps are extremely oily; others are very dry.

GOOD CARE HELPS TO MAKE THE HAIR BEAUTIFUL

Healthy hair, like healthy skin, depends first of all on keeping the body in good physical condition. A run-down condition of the body (a fever, for instance) affects the hair noticeably. Often it becomes gray and drops out. Good habits of eating, sleeping, exercising, etc. are necessary for good hair.

The hair should be shampooed whenever the hair and scalp become dirty. This will vary with different people. Some will need to shampoo the hair every week; others less frequently. A good habit for most people to form is that of shampooing the head about once a week. If the scalp seems dry after shampooing, a little grease, such as white vaseline, may be thoroughly rubbed in.

Any good toilet soap will do for shampooing. The highly advertised medicated soaps on the market have no special advantages.



THE NAIL GROWS OUT OF A FOLD IN THE SKIN

Hair to be healthy must be supplied with a good circulation in the scalp. A good massage of the scalp and thorough brushing of the hair will help to improve the circulation and give the hair a glossy appearance.

The Care of the Nails. The nails, like the hair, are a growth of the epidermis, but the lowest cells near the roots are alive. The nail grows out of a fold of the true skin and may be regarded as a very wide and flat hair. A nail will reproduce itself about three or four times in a year. It would be very difficult to pick up objects without nails. They also protect the ends of the fingers.

The nails need to be kept clean and properly manicured

to prevent the fingers from getting sore, and especially to improve the appearance of the hand. Dirty and neglected finger nails are very repulsive to most people. They often prevent boys and girls from getting good positions or from earning promotion to better ones.

Finger nails should be cut in a curve with curved scissors. The file may then be used to give smoothness.

The Art of Dress. Clothes should meet the needs of health, comfort, and attractiveness. To do this, clothing should keep the body at a constant temperature, it should be light in weight so as not to be a burden, it should be loose to give freedom of action, and finally it should be neat and well-fitting.

The working of the human machine, like all machines, creates heat. This heat must be regulated in some way so as to keep the body at a temperature of 98.8 degrees. This is the bodily temperature which the cells must have for health and life. The temperature is so important that, as everybody knows, the physician regards it as a key to one's physical condition. If it varies two or three degrees from normal, it is a sign that something is wrong.

When the body gets too hot, it cools itself by throwing off some of its heat into the air. This is furthered by the rushing of the blood to the surface. Perspiration also helps the cooling process. It is quite evident that in summer the clothing should protect one against the direct rays of the sun and aid the body in keeping cool, whereas in

winter it should help the body to retain the heat needed. Different kinds of clothing vary in their power to conduct heat. The more air spaces a garment has, the less it will conduct heat. Woolen cloth, which is fluffy and has many air spaces, is warmer than cotton, with its few air spaces. One serious fault with woolen garments is their shrinking after being washed. Woolen seems admirably adapted for winter wear. It has a loose mesh which allows the air to get to the skin and permits moisture to be absorbed, and it is light in weight and retains the heat in the body. Both cotton and linen are especially good for summer wear. Fur has an air-tight leather base which prevents evaporation from the skin. It is suitable only for outdoors on extremely cold days. Rubber garments are good to protect the body from wet, but are likely to be uncomfortable because they do not allow evaporation.

Since the temperature indoors is likely to be that of summer, it is desirable, especially for those who spend most of their time indoors, to dress lightly and put on warmer outside wraps when going out of doors. Wearing heavy underwear is probably a common cause of colds, as it tends to make the skin sensitive to changes in temperature. Cotton underwear is the best all-year material for sturdy children and adults. Underwear of woolen mixed with cotton, linen, or silk is suitable for infants, the aged, and the anæmic.

Underwear should always be removed on retiring and

spread out where it can air thoroughly overnight. It should be changed frequently, especially in warm weather. Soiled underwear favors the development of skin diseases. Unless underwear is changed at least once or twice a week a very disagreeable odor is likely to result.

The outer clothing should be the minimum amount that will keep the body comfortable. Light-colored clothing is best for summer because it reflects the sun's rays away from the body. Dark colors, since they absorb light rays, are warmest in winter. Heavy coats and sweaters should be removed on entering a room, provided it is at the proper temperature. Neck mufflers should be of a medium weight and should not be worn except on cold or snowy days. Close covering of the neck coddles the skin and lowers the natural resistance to colds. Spats or leggings should not be worn except on extremely cold or snowy days.

For attractiveness and comfort garments should be neat and clean and should fit properly. It is possible to have such clothes without additional expense. Neatness and cleanliness are within the reach of everybody; and if judgment is used in the selection of clothes, they will fit properly. The body should not be hampered by tight clothing. It interferes with the circulation and sometimes causes a displacement of the internal organs. Collars should be large enough for comfort. Hats should be loose enough to permit free circulation of blood to

the scalp. Skirts should be suspended from the shoulders or hung loosely from the hips.

When fashion meets the requirements of health and attractiveness, it should be followed; but it is often ridiculous and harmful to follow Dame Fashion blindly. Generally if one uses reason the fashion may be modified somewhat so that one is not out of style and yet dresses with taste and comfort.

The way one dresses is very important not only for health but also for business and social success. The dress often proclaims what the person is.

Remember

1. One of the very best ways to improve one's appearance is to learn to be healthy.
2. A healthy skin is attractive.
3. Refined manners are an aid to success.
4. One of the marks of a refined lady or gentleman is having clean hands and well-cared-for nails.

Write a list of other things worth remembering.

Health Habits

1. Practice all the rules of healthy living if you wish to have a clear, healthy skin.
2. Attend to regular elimination.
3. Drink plenty of water.
4. Keep the skin clean.
5. Wash the face at least twice every day.
6. Take a warm bath at least once a week for cleanliness.

7. Avoid cosmetics.

8. Keep the scalp clean.

9. Brush the hair frequently.

Name other desirable health habits that make one more attractive.

Things to Do

1. Examine the skin with a magnifying glass. What do you notice?

2. Look in the mirror every morning before you go to school to make sure that you are clean and neat.

3. Have a morning inspection of hair, hands, and nails.

4. Write an essay on health and beauty.

5. Write to the State Health Department for bulletins showing analyses of cosmetics.

6. Study the figures on pages 130 and 135 showing the skin, hair, and nails, and explain what you find.

7. Make a scrapbook showing the dress of people in different parts of the world.

Review and Thought Questions

1. Does one's appearance have anything to do with success and happiness? Explain.

2. What is the name of the outer layer of the skin? What is its work?

3. What is the name of the second layer of the skin? What is its work?

4. What is the use of tan?

5. How does good health promote a good skin?

6. What is the value of a warm bath? a cold bath?

7. What danger is there in using cosmetics?

8. What do you think about a person who has dirty hands and finger nails? How may the nails be kept in good condition?

9. How does a hair grow?

10. What part is alive?

11. Why is brushing the hair a good habit?

12. What other habits are necessary for a healthy scalp and attractive hair?

13. What does a cat do to keep her fur in a good condition? Explain.

14. What care do the finger nails need?

15. How do birds clean and oil their feathers?

16. What needs should clothing meet?

17. What is the normal body temperature? Why is it important?

18. What are some advantages and disadvantages of cotton and woolen fabrics for clothing?

19. Why is there danger in dressing too warmly?

20. What should be our attitude toward style?

21. Explain the last sentence of this chapter.

CHAPTER XV

A HEALTHY MIND AND NERVOUS SYSTEM

Four Tests for Success. Every boy or girl who reads this book expects to be successful. The success desired may be in playing football, climbing mountains, painting pictures, or taking part in dramatic performances. No matter what it may be, that boy or girl who has a good healthy body and mind has made a good beginning. Here are four questions that every child might ask himself:

1. Do I have good, healthy sense organs such as eyes and ears?

2. Do I have a healthy brain and nervous system for clear thinking and planning?

3. Do I have strong and skillful muscles to do the things I should like to do?

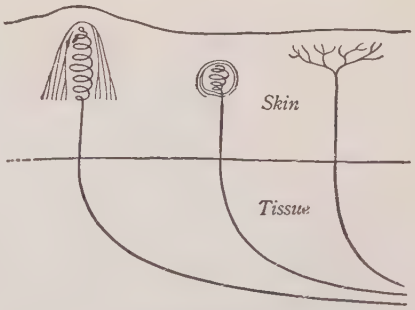
4. Do I have good mental habits?

The pupil who has these four requirements has a good start on the road to success.

Value of Healthy Sense Organs. The sense organs are valuable because they tell us about the world outside our own bodies and also the condition of our own bodies. Without the eye there would be no color, without the ear there would be no sound, and without the little taste buds

on the tongue there would be no taste. Without sense organs we could not learn or know anything about the world in which we live. Each sense organ is a kind of window that gives us a chance to learn. Trouble with a sense organ, like blindness or deafness, means shutting out some of the messages we really need.

The eye and the ear are the principal sense organs, but all the others are important. The taste buds of the tongue help us to enjoy our food. The organs of smell in the nose also help us to enjoy our food and the fragrance of flowers and serve to warn us of conditions that may not be healthful. There are sense organs within the body that warn us of thirst, hunger, fatigue, dizziness, nausea, etc.

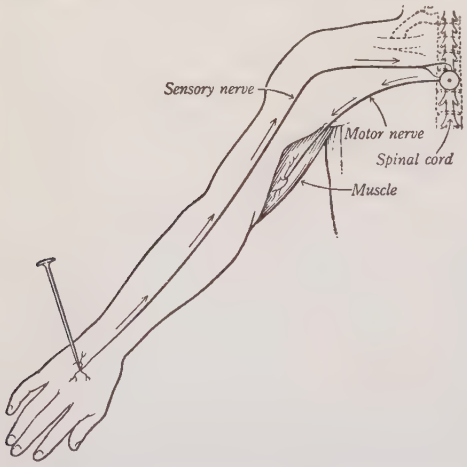


SENSE ORGANS

These little organs of the skin tell us many important things about the world. They are highly magnified in this drawing

The skin is the part of the body where the sense organs are most plentiful. This is especially true of the tips of the fingers and the lips, where there are hundreds of them for every square inch of surface. From these sense organs we get messages of pain, temperature, and contact. These messages are very important for health and safety.

The Nerves. A long silvery thread called a nerve runs from every sense organ. Whenever a sense organ is stimulated, the message of color, sound, or whatever it may be is carried over a nerve. Those nerves that carry messages from the sense organ are called sensory nerves.



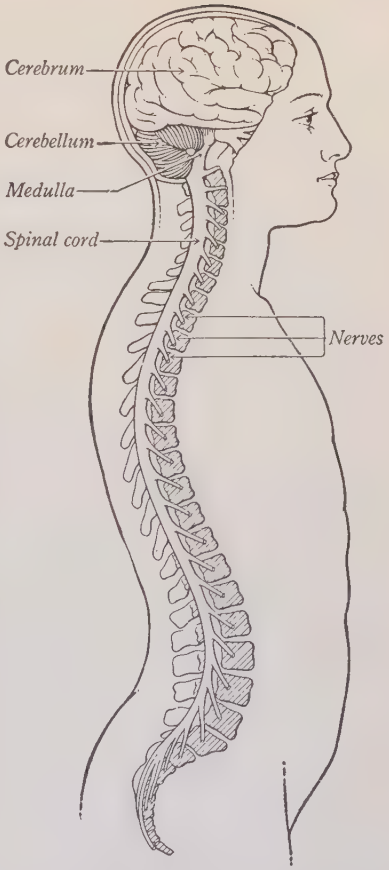
THE PATH A MESSAGE MAY TAKE WHEN THE HAND IS PRICKED

Every message from the sensory nerves is carried to some central organ of the nervous system, like the spinal cord or brain, where it is switched over to another kind of nerves that run to the glands and muscles. These nerves, called motor nerves, stimulate the muscles to activity which generally results in motion.

If the sensory nerves leading from the right arm were destroyed by accident or disease, there would be no sensation from the arm. If the motor nerves leading to this same arm were destroyed, not a muscle could be moved. The arm would be paralyzed.

The Brain and Switching Centers. The nervous system works very much like a telephone system. When A wishes

to call B on the telephone, he first calls the operator at a central. The operator then selects out of a number of possible connections the one that leads to B. The nervous system acts in much the same way. When the hunter sees the duck, the message is sent from the eye along a sensory nerve to a central station and then to the nerves that have to do with lifting the gun, taking aim, and pulling the trigger. In the nerve central, however, the connection may be made automatically. When a habit has been once established, the message passes along to the right muscles because the pathway has been made easy by long use. When one faces a new situation, the connection may be made in some way through what we call thinking.



THE CENTRAL ORGANS OF THE NERVOUS SYSTEM

The main centers of the nervous system are the spinal cord and the brain. They are the big bosses of the body.

The spinal cord is found in a canal of little bones called the vertebræ, which together are sometimes called the vertebral column, or backbone. Branching from the spinal cord are thirty-one pairs of nerves. All the connections made in the spinal cord function without consciousness.

At the top of the spinal cord is a bulbous enlargement called the medulla, which has charge of the respiration and the heart beat.

There are two brains: the cerebellum, or little brain, which has control of some unconscious activities, and the large brain, or cerebrum, which is the seat of consciousness. The cerebrum is well protected by the skull and is guarded from shocks by a fluid in which it rests. It has two main parts, or hemispheres, and resembles an English walnut in shape. The cerebrum is the main central station.

The sympathetic nervous system is composed of two chains of ganglia, or masses of nerve cells and fibers, which run parallel on each side of the spinal cord. It is joined to the general nervous system by connecting nerve cables and has direct control over the organs of digestion and other internal organs.

Keep in Good Physical Health. One way to keep the nervous system healthy is to look after the general physical health of the body. The nerve cells are part of the body as much as the muscles. They must be nourished,

and they must receive oxygen to work. Nourishing food, fresh air, and all the health habits mentioned in this book help to keep the nervous system in a healthy condition.

SLEEP IN THE FRESH AIR

Sleeping long hours and breathing fresh air builds strong bodies and makes happy children. (Courtesy of the Boston Tuberculosis Association)

Rest, Recreation, and Sleep. The nerve cells, like muscles, may be worked too long and may become fatigued. This often makes one nervous and irritable. Rest and sleep are excellent habits to keep us mentally fit to do our work. A serious railway accident occurred not long ago. Investigation showed that the engineer had had no sleep

for thirty-six hours. His eyes and brain were in no condition to see the signals or control his locomotive. It is no wonder he became very drowsy. Boys and girls who read this book should get from nine to ten hours of sleep.

RECREATION FOR THE BLIND

These children are blind, but they have learned how to do many things gracefully. (Courtesy of the Pennsylvania Institute for the Instruction of the Blind)

Recreation also is valuable for the nervous system. In doing something that we like, a new set of nerve cells are used and the others may be rested. The very best kind of recreation is one that takes us out of doors. Skating,

swimming, boating, and tramping are all excellent forms of recreation. We need some kind of recreation every day.

Train the Muscles. Everybody should train his muscles to do something worth while either in work or in recreation. It may be in playing a game, in doing carpentry, or in sewing. This is so useful for the health of the nervous system that when some of the soldiers returned from the World War in a nervous condition and discouraged, they rapidly regained their health when they were taught to weave rugs or do something with tools. To be able to do things with one's muscles dispels the feeling of helplessness and leads to a sense of mastery and satisfaction.

Mental Health Habits. All health habits that promote the physical health of the body help also to make the brain and the nervous system healthy; but there are some health habits that are mental rather than physical. To be in good health one's mind as well as body must work right.

Here is a list of mental health habits that are just as important as breathing fresh air and having good posture:

1. *Face your difficulties squarely.* It is said that when Roosevelt was in the White House he and his whole family on Saturday afternoons went for a hike. The motto of President Roosevelt was "Go over or through everything, around nothing." Those who failed to go over or through bushes, fences, or rocks had to drop out of the ranks and return home. This was a policy which Roosevelt followed throughout life.

Boys and girls who have difficulties should do their very best and never try to justify their failures by complaints and excuses. It is a bad mental habit to excuse oneself for not doing certain things.

One of the best examples of meeting the disagreeable in life is offered in the career of General Robert E. Lee. He was a great soldier, if anything greater in defeat than in victory. He accepted defeat without bitterness, and with splendid courage devoted the remainder of his life to establishing peace and good will throughout our country.

2. *Give your full attention to whatever you do.* Never allow yourself to dawdle. In work and in play do whatever you are doing whole-heartedly. By so doing you will discipline your mind for healthy and successful living.

3. *Think of health, not disease.* Suggest to yourself the very best thoughts. Read clean, wholesome books and engage in the best kinds of recreation. Form the necessary health habits and do not worry about sickness. The illnesses people worry about seldom come.

4. *Take criticism kindly.* Most people resent criticism. No matter how true it may be, one is likely to deny the fault and possibly harbor a grudge against the person who offered the criticism. This is a bad mental habit because it is likely to make one unhappy and also because it interferes with one's mental growth and success. Under such conditions it is difficult for one to improve in his way of meeting the world. A better mental habit would

be one of friendly gratitude for criticism. Boys and girls should learn to criticize each other in a friendly way.

It is said that one of the reasons why Benedict Arnold became a traitor was because some criticism of his conduct

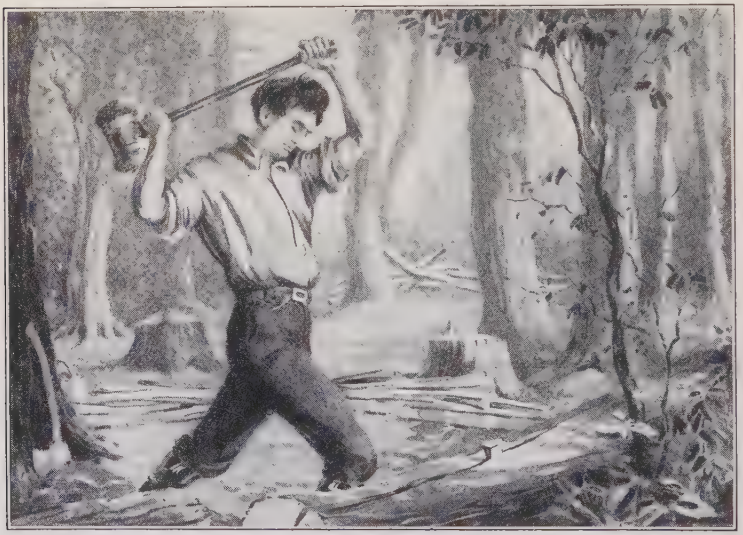
IT IS A GOOD HABIT TO MEET DIFFICULTIES WITH A SMILE

Courtesy of the Boston Tuberculosis Association

by Washington rankled in his heart. If he had accepted criticism thoughtfully and corrected his faults, he might have been known in American history as a brave patriot instead of as Benedict Arnold the traitor. How different was General Grant! It is said that he never held a grudge. He would not allow himself to be upset or have his energy wasted by permitting anybody to stir

up his hatred. He avoided this by training himself to take criticism and by doing his work faithfully.

5. *Make daydreams work.* It is fun to "build castles in Spain," but doing only that weakens one's mind and



ABRAHAM LINCOLN

An active life in the open air gave him a healthy body. His mind was healthy because he did his work promptly and cheerfully

makes him queer. Daydreams are very much worth while if we dream about the things we want to do and then set out to do them. Roosevelt had a very bad habit of idle daydreaming when a boy. He cured himself of this by spending less time in daydreaming and more time in boating, boxing, and collecting nature specimens.

How Lincoln kept his Mind Healthy. Abraham Lincoln had a fine, healthy mind, but he had hard work to form the right kind of mental habits. Like Roosevelt, as a child he was inclined to daydream too much, but he did not allow these dreams to interfere with work that had to be done. If there was wood to be chopped or rails to be split, Lincoln did his work cheerfully and well. Another good mental habit that Lincoln had was to square up his accounts with life each day. As a clerk in a store he walked many miles at the end of a hard day's work to correct a mistake in making change. He would stop to return to the nest the baby birds that had fallen out. If his conscience hurt him, he eased it at once by the right kind of action. He refused to bear ill will against anybody. One of the very best of Lincoln's habits was that of being unselfish. He forgot himself in doing kind acts for others.

Here are some sayings of Lincoln worth remembering:

Do not worry.
Eat three square meals a day.
Say your prayers.
Be courteous to your creditors.
Keep your digestion good.
Exercise each day.
Go slow and easy.

Maybe there are other things that your special case requires to make you happy, but, my friend, these, I reckon, will give you a lift.

Remember

1. A healthy mind is the key to success.
2. The sense organs are gateways to knowledge.
3. Sensory nerves carry messages from the sense organs to the spinal cord and the brain.
4. The brain is a switching center like a telephone central.
5. Messages pass from the brain over motor nerves to the muscles.

What other facts do you remember from the reading of this chapter?

Health Habits

1. Keep the body in good physical condition.
2. Eat nourishing food, play, rest, and sleep.
3. Learn to do things with your hands.
4. Make your daydreams work.
5. Avoid bad mental habits.

Name other desirable mental health habits.

Things to Do

1. Shave a place on the back of your hand. Mark out with ink a place about an inch square. Go over this area, touching the skin with a cold nail. Do some spots feel cold while others do not? Make a little drawing and put in the cold spots. Try a similar experiment on the same area with a fairly hot knitting-needle. Try a third experiment by pricking the skin with a sharp needle. Go over the area also with a stiff horsehair. How many different kinds of sense organs do you conclude are found in the skin?

2. Study the drawings and diagrams in this chapter and point out the different parts of the nervous system. Discuss the work of each.

3. Read Hagedorn's "Life of Roosevelt" to find good mental habits Roosevelt formed besides those already mentioned.

4. Read more about Lincoln to find out whether he had other good mental habits besides those mentioned in the text.

5. Read the lives of George Washington, Robert E. Lee, Thomas Edison, and other great men to find out what mental habits they had that made them successful.

6. Read the life of Helen Keller and find out how her mind was a blank because of some defective sense organs and how she trained herself to get messages and thus in time became a highly educated woman.

Review and Thought Questions

1. Name four requirements for success.

2. What is the work of a sense organ? Name the sense organs mentioned in this chapter.

3. What is a nerve? What kinds of nerves are there? What work do they perform?

4. What are the parts of the central nervous system? Describe their work.

5. How is the nervous system like a telephone system?

6. What institutions in your state are established for those suffering from mental disease or defect?

7. Does physical health have anything to do with a healthy mind? Explain.

8. What are some good mental habits?

9. What good mental habits did Lincoln have?

CHAPTER XVI

GOOD EYES AND EARS

Stupid Joe Sees. Joe was a good little fellow and tried hard in school, but somehow he couldn't do as well as the other boys and girls in his class. After studying his lessons for a short time he had a headache. His classmates began to call him Stupid Joe.

Joe finally grew to hate school and to avoid his companions. His marks at school grew worse and worse, and finally he failed to be promoted. His parents and his teacher despaired of being able to help him. Poor Joe!

One day his cousin Frank from a neighboring city visited him. Frank wore glasses. While they were playing, Joe in fun tried on his cousin's glasses. He picked up a book to see how it looked and then gazed through the window at the trees and hills.

This was a wonderful day in Joe's life. He ran to his mother, shouting as if he had just received a wonderful present. "Oh, mother," he cried, "get me a pair of glasses like Frank's. I can read every word in this book. The fields, the birds, and the sky are more beautiful."

The very next week he appeared with some new glasses that were fitted especially for him.

"Miss Chase," he said to his teacher, "print is black, isn't it?"

"Yes, Joe; what did you think it was?"

"Why, gray, and sort of mixed-like. Then, too, the letters look straight up and down."

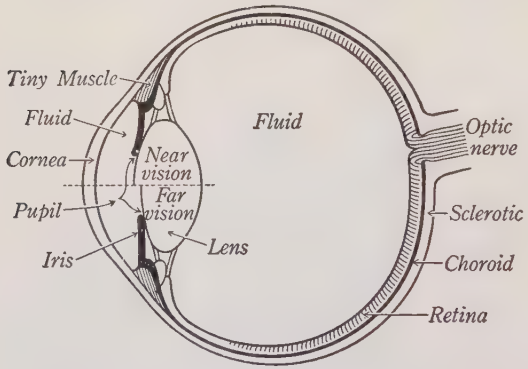
Joe now took such an interest in school that he became one of the best pupils in his class. The next year he did two years' work instead of one. His headaches had disappeared. This all happened because he could see. It is very hard to be happy or successful unless we have good eyesight.

JOE TRIES ON FRANK'S GLASSES

How the Eye is Protected. The eye, which means so much to our welfare and happiness, is well protected. It is lodged in a bony cavity in the skull and is protected by the overhanging brow. The eyebrows catch the sweat and turn it aside. The eyelashes keep out the dust. The eyelids are shutters made to protect the eyes as well as to shut out the light during sleep. When danger threatens, the lids close

without any conscious effort and with great speed. If dirt really gets into the eye, it is likely to be washed out by a flow of tears; a duct to the nose serves for drainage.

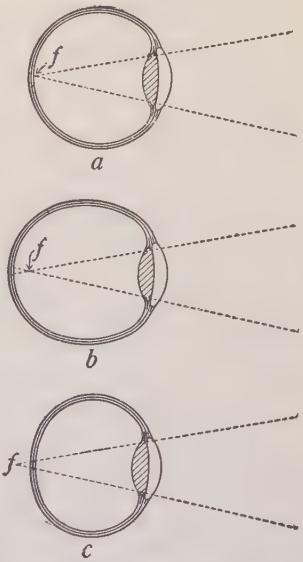
How the Eye is Made. The eye has three coats. The outer coat—the white of the eye—is called the sclerotic coat. Only a small part in front, the cornea, is highly transparent. The middle coat, the choroid, is black, so as to prevent light from coming into the eye except through the cornea. It lines the sclerotic coat except in front. Near the cornea it projects forward, making the colored curtain called the iris. The hole in the iris is the pupil. This little window becomes larger or smaller, to let in the right amount of light for seeing. The innermost coat, or retina, is like a photographic plate, very sensitive to light. In the retina are the fibers of the optic nerve, which goes to the brain. Back of the pupil of the eye is a double convex lens, like the lens of a camera. It is fastened to the choroid coat by little ligaments. When the eye is focused on a distant object or



PARTS OF THE EYE, SHOWING HOW WE SEE

is at rest, the lens tends to be flat. For close work tiny muscles contract, making the lens more convex. (See drawing on page 158.) Why is reading always fatiguing?

Seeing with Normal Eyes. The length of the eyeball has much to do with good vision. Notice drawing *a* at the right. The rays of light entering the eye are from a distant object. Passing through cornea, fluids, and lens they are brought to a point, or focus, on the sensitive retina. There the optic nerve receives the message, carries it to the brain, and the object is seen. In the normal eye the length of the eyeball is just right so that the rays from a distant object are focused easily on the retina. The eye, like a camera, must be properly focused to get clear images.



GOOD AND BAD EYESIGHT

a, the normal eye; *b*, the nearsighted eye; *c*, the farsighted eye; *f*, focus. Notice the way the different length of eyeball naturally focuses in distant vision

In the normal eye the distant object is focused without any change in the shape of the lens. But in close work there would be a blur if the tiny muscles did not work to make the lens more convex.

The eye is always under strain where we are doing close work. There is no strain of the tiny muscles when the normal eye is directed toward distant objects. Therefore, looking up from our reading now and then to gaze at the opposite side of the room rests the eye.

Farsightedness. When the eyeball is too short, the rays do not reach a focus on the retina naturally; they focus behind the retina. Under such conditions the muscles of accommodation must work even in distant vision. The eye is then said to be farsighted. There is never a time when this eye is in use that it is not being strained. Sometimes the eyeball is so short that the person cannot see anything near at hand clearly, or cannot see anything for long at a time. Such a person is likely to feel the need of glasses. Suitable glasses will correct the vision and remove the strain.

There are some farsighted children who can see to read, but are very nervous or suffer from illness of some kind. The imperfect eye is not suspected, yet it is the cause of the illness or nervousness because the eye is doing its work under great strain.

Nearsightedness. When the eyeball is too long, the rays of light are focused before they reach the retina. Objects in the distance appear blurred; objects close to the eye may be seen more clearly. This is a nearsighted eye. Children with such eyes find it difficult to see the details of a landscape. They tend to hold their books close to

their eyes. There is often squinting to shut out the slanting rays of light. The nearsighted child may develop stoop shoulders by bending over his desk to bring his eyes close to the print. His eyes cannot adjust themselves for distant objects. Nearsightedness can be corrected by glasses.

Astigmatism. The cornea of the eye—the part that bulges out in front—needs to be regular in shape for good vision. If the curve of the cornea is irregular, some rays of light will not focus properly—at least never without strain. This trouble, called astigmatism, is quite common. It may be present whether the eye is nearsighted or farsighted. Astigmatism causes much discomfort. It may be corrected by glasses.

IF THESE LINES AND LETTERS APPEAR EQUALLY BLACK AND CLEAR, YOU HAVE NO ASTIGMATISM

Muscular Strain. Each eye is moved by six muscles. These muscles must move together so that the rays of light will fall on similar parts of the retina of each eye. If this does not happen, one sees double. You can easily prove this by looking at something far away. While keeping your eyes in this position, move your pencil for-

ward and backward in the direction of your nose. If you try this experiment long enough you will be able to see two pencils.

People who are born with some of their eye muscles weak find it very hard to make their two eyes work together. This means a constant strain whenever the eyes are in use.

VISION WHERE THERE IS EXTREME ASTIGMATISM

Testing the Eyes. Most persons who have trouble with their eyes do not know it unless they have had their eyes tested. If the class that uses this book will turn to the Vision Chart for Schools in the Appendix, on page 369, and test the eyes of all the children, some may be found to be farsighted or nearsighted.

To test for astigmatism look at the figure on page 161. If the lines are all equally clear and black, there is no trouble. The drawing above shows the vision of an eye with an extreme astigmatism.

There is sometimes trouble with the eyes that cannot be discovered by ordinary tests. Redness of the eyes,

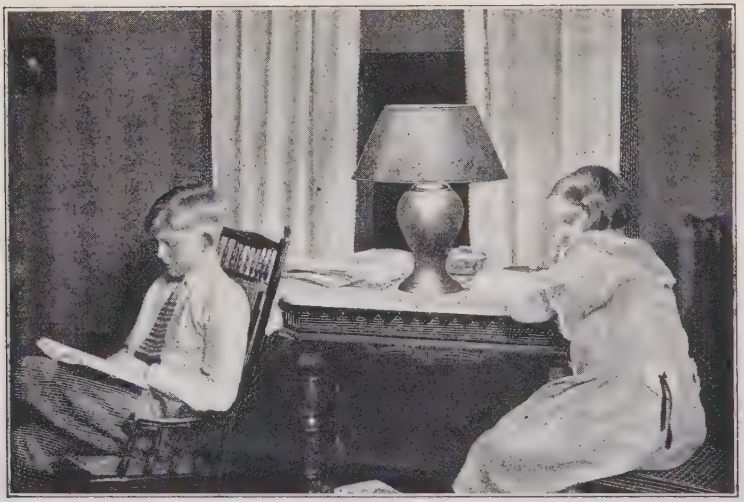
squinting, holding the head crookedly, suffering from pain in the head, and bending closely over reading or work often indicate that something is wrong with the eyes.

Removing Dirt from the Eye. Any bits of dirt or cinders that get into the eye are likely to be washed out by the flood of tears which such irritation causes, but sometimes it is necessary to remove the source of the irritation directly to bring relief. If it is under the lower lid the eyelash may be seized, the lid drawn forward, and the particle removed with a corner of a clean handkerchief. It is harder to handle the upper lid because there is a little cartilage just above the eyelashes. The patient should look downward. A match should be pressed against the upper part of the lid. The eyelashes may then be seized and the lid turned upward and over the match. Whatever is irritating the eye may then be seen and easily removed.

THE WAY TO REMOVE DIRT FROM THE EYE

Care of the Eyes. Even one who is born with good eyes may ruin them by improper use. Here are some important suggestions for the care of children's eyes:

1. Avoid reading small print. It strains the eyes.



WHICH OF THESE CHILDREN HAS LEARNED HOW TO TAKE GOOD CARE OF THE EYES?

2. Avoid reading in the twilight or reading much by artificial light.

3. Read with the light coming over the left shoulder. Never face the light.

4. Rest the eyes frequently in doing close work.

5. Have your own eyes tested.

6. If there is any trouble with the eyes go to a reliable oculist.

7. Use an individual towel and wash cloth. Eye diseases are often spread through the common towel.

8. Be as careful of your eyes as you would be of your watch. You can buy a new watch, but you cannot buy new eyes.

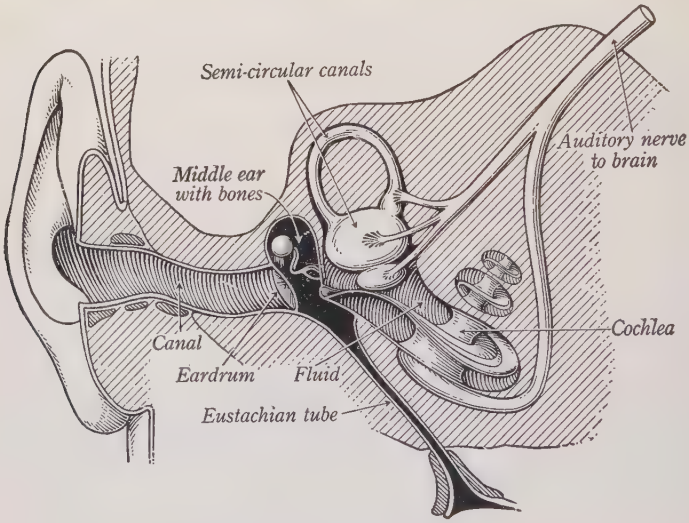
9. Take especially good care of your eyes during and soon after measles.

Importance of Good Hearing. Good hearing is almost as necessary for success in school as good sight. Without good hearing children fail to hear a great deal that the teacher and the other children say. Often they understand a part of what is said and imagine something that is not said. People who are hard of hearing often become expert in reading other people's lips and do not know that they are hard of hearing. Every school child should have his hearing tested. If it is found defective a physician should be consulted at once.

How we Hear. To understand how we hear, it is necessary to know how the ear is constructed. The ear is divided into three parts. The outer ear consists of folds of cartilage and a canal across the end of which is stretched a skin called the eardrum, tympanum, or tympanic membrane. The entrance to this canal is guarded by hairs. Along the canal are glands which secrete a bitter wax.

In the middle ear there is a chain of three tiny bones called the hammer, anvil, and stirrup, bound together and fastened to the tympanum by ligaments. Another canal,

called the Eustachian tube, leads from this inner cavity to the upper part of the throat. This tube makes possible the same pressure of air on both sides of the eardrum. Inflammation of the throat caused by a cold sometimes



THE PARTS OF THE EAR

spreads up this canal and causes temporary deafness. A chronic cold will sometimes result in complete deafness.

The inner ear consists of a number of cavities containing a liquid. In these cavities rest the endings of the auditory nerve. The cavity which has most to do with hearing is called the cochlea. The semicircular canals probably have nothing to do with hearing but help us to keep our balance.

What is called a tone or noise begins with sound-waves. These waves enter the auditory canal, set the drum vibrating, and are then conveyed by the chain of bones across the middle ear to the liquid of the inner ear. The vibrations of the liquid in the cochlea start impulses in the auditory nerve which, carried to the brain, allow us to hear.

The Care of the Ear. These are suggestions for keeping the ear in proper condition:

1. Wash the ears with soap and water at least once every day. In washing the canal go no deeper than you can reach with the tip of the finger covered with a damp cloth.

2. Do not pick at the wax in the ear, especially with a sharp instrument.

3. If the wax hardens and collects in the ear, syringe out the ear gently with warm water.

4. In play avoid striking anybody across the ear. It may break the eardrum.

5. Have your hearing tested.

6. If you have trouble in hearing, go to a physician at once.

Remember

1. Good sight makes work easier.

2. The eye is protected by the brow, eyebrows, and eyelashes. Tears wash out the eyes and keep them moist.

3. The eye has three coats.

4. Trouble with the eyes often causes headache and indigestion.

What other things do you remember from the reading of this chapter?

Health Habits

1. Study in a good light.

2. Rest your eyes frequently when reading.

3. If you wear glasses, see that they are always properly adjusted.

4. Keep your ears clean.

Name other health habits relating to the eye and ear.

Things to Do

1. Write a story about the time Mary first wore glasses.

2. Make a drawing of the eye.

3. Test your own eyes.

4. Take turns in testing each other's eyes.

5. Test each other's hearing. (See Appendix, p. 370.)

6. Study the figures and diagrams of the eyes and ears in this chapter and explain the working of each.

Review and Thought Questions

1. Why did Joe have headaches and appear stupid?

2. How is the eye protected?

3. How does the eye resemble a camera?

4. What are the parts of the eyeball and the work of each?

5. How do we see? Explain by a drawing which you will put on the blackboard.

6. What is farsightedness? nearsightedness? astigmatism? What is the cause of each? How do such troubles affect the vision and health?

7. How are eyes tested? Why? In what other way may we know whether the eyes need special attention?

8. How may dirt best be removed from the eye?

9. What suggestions are given in this chapter on the care of the eyes?

10. How do we hear?

11. What are the parts of the ear? Describe each.

12. Why is hearing so important in learning?

13. What suggestions are given in this chapter on the care of the ears?

CHAPTER XVII

WORKING FOR SAFETY

Alert Boys and Girls. This is a dangerous world for boys and girls to live in unless they have their eyes and ears open. Automobiles are increasing so rapidly that it is now as dangerous to cross the street as it is to cross a railroad track—often more dangerous. The boy you see in the picture on page 171 is alert and wide-awake. He is calling attention to the sign installed in one of the streets of Los Angeles. He is doing his part to make Los Angeles a safer city in which to live. Many boys and girls throughout the land are doing their bit for the safety of themselves and their community.

Omaha made Safer. The city of Omaha, Nebraska, was alarmed at the rapid increase in automobile accidents. Her citizens decided to make Omaha a safer place in which to live. Whenever the citizens of a community decide to work together they are usually successful.

There are at least two very important reasons why accidents happen: first, automobile drivers are careless; secondly, people who walk on the street are careless. Omaha determined to check reckless driving. Children in the schools were instructed regarding safety.

A safety committee of one hundred and twenty men was formed in the chamber of commerce. These men pledged themselves to serve as volunteer traffic officers without pay. They were not to wear uniforms and were to enforce only the automobile laws. Through their work two thousand summonses were sent to drivers who had violated the traffic laws, and 85 per cent of these were convicted in the court.

A SCHOOLBOY IN LOS ANGELES HELPING TO KEEP PEOPLE OUT OF DANGER IN CROSSING THE STREET

The schoolboys, especially those who were Boy Scouts, helped at lunch hours and after school. They reported those automobiles that were exceeding the speed limit and those that otherwise were not obeying the law. They worked very hard for safety.

Circulars and booklets advising safety were distributed all over the city. Billboards and motion pictures appealed for careful driving.

What was the result? The first two years that the

safety committee was at work the deaths from automobile accidents were reduced one half. This was done in spite of the fact that during that time the automobiles in Omaha increased 14 per cent.

Junior Safety Councils in Massachusetts. The number of children killed on the highways of Massachusetts has been so large that the schools have taken steps to protect their pupils. The children themselves take a very active part in this safety campaign. In many of the schools of the state the children are organized in Junior Safety Councils. All the members of these councils take a pledge to be careful and to work for the safety of others and so reduce accidents. These leagues have greatly lessened the number of accidents on Massachusetts highways.

Safety Work by St. Louis Children. St. Louis, Missouri, is a city that, like Omaha, has done much for safety. The children themselves are doing much to prevent accidents.

In many of the schoolrooms there is a committee on safety. It is the duty of this committee to inspire everybody in the room to be careful and so avoid accidents. Every week this safety committee makes a report to the room. The members report on the accidents and fires they have heard or read about, especially those in their own communities. They report on the health of the city also and give suggestions about the correction of prac-

tices which they have seen among children. Any pupil in the room may add to the report.

This committee also has an honor roll. Awards are made once a week for those who have done something

© Keystone View Co.

A LESSON ON SAFETY

This is a Washington policeman giving the children a talk on safety. The children like the pictures he draws

especially worth while for safety. Here are some of the ways in which a pupil may get his name on the honor roll:

1. By presenting to the room the best kind of safety rule. The best rule is decided by a vote of the class.

2. By writing the best promise on safety; for example, "I promise not to skate on thin ice."

3. By making the best drawing or showing a picture of himself teaching a lesson on safety.

4. By bringing to class the best clipping on carefulness.

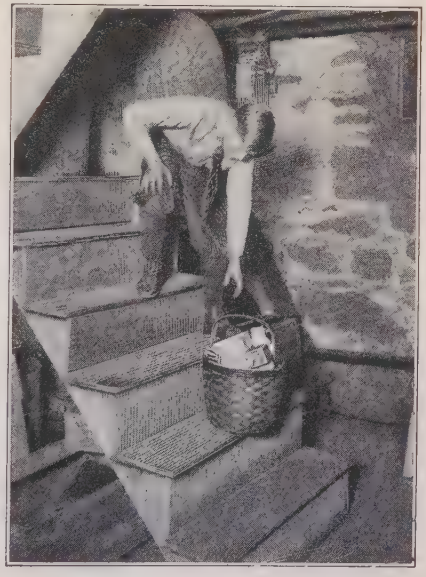
AT CERTAIN HOURS THERE IS NO TRAFFIC ALLOWED ON THIS STREET. IT IS KEPT SAFE FOR PLAY

5. By teaching the room through pantomime the best safety lesson; for example, how to board a street car, the danger of banana peels, etc.

6. By preparing and giving the best four-minute speech on the prevention of accidents.

7. By passing the best examination for the month on

some questions like these: What would you do on discovering a fallen wire? What may the automobilist reasonably expect of the pedestrian? Name five ways by which you can distinguish a careful person. Give one important precaution about the use of firearms. Name eight or ten safety devices with which you are acquainted for the protection of human life.



A GOOD SCOUT

"Many serious accidents happen because things are left carelessly on the stairs. I will put this basket in a safe place"

Every safety committee has a further duty. It must know the location and use of the chemical fire extinguishers in the building and of the safety material, how to give the fire alarm in case of a fire in the school building, and just what to do in case there is an accident.

Common Causes of Accidents. To help the children give their weekly reports on accident prevention every pupil in the St. Louis schools is provided with a list of these common sources of accident and sickness:

1. A carelessly thrown match.
2. A broken window.
3. A projecting nail.
4. An unclean can or bottle.
5. Alighting from a car in the wrong manner.
6. Careless roller-skating.
7. Reaching out of a window.
8. Trying to recover objects from deep water.
9. Catching on cars and wagons.
10. Playing tag in the street.
11. Jumping on or off moving cars.
12. Careless throwing.
13. Handling discarded cigarette stubs.
14. Tripping or removing a chair from under a person.
15. Holding an umbrella over the face in crossing a street.
16. Skating on thin ice.
17. Neglect of a wound or scratch.
18. Handling fallen wires.
19. Sucking a dirty finger.
20. Chewing the corner of a handkerchief.
21. Holding money in the teeth.
22. Eating candy or fruit which has been exposed in insanitary places.
23. Leaving matches where rats or mice can get them.
24. Throwing a banana peel on the street or sidewalk.
25. Standing on a rocking chair.

26. Sitting in a draft.
27. Sleeping without ventilation.
28. Carrying a pen or pencil with the point exposed.
29. Running through a building.
30. Crossing a street in the middle of the block.
31. Standing in a street waiting for a car.
32. Holes in the sidewalk.
33. Unsafe furnace pipes.
34. Accumulation of rubbish in a basement.

Safety depends on Safety Habits. There is now a good deal of evidence to show that if people are careful most accidents can be prevented. It has become quite the fashion to have in many communities what is known as safety week. During that week the newspapers print much about safety. Street cars carry special posters to remind the public. Teachers and pupils are asked to help reduce accidents during the week. These campaigns for safety are usually successful, as is shown by the following results in five of our largest cities for the same year:

ACCIDENTAL DEATHS

	Safety Week	Previous Week	Reduction Per Cent
New York	30	70	57
Washington	2	6	66
Pittsburgh	9	22	60
Baltimore	2	9	77
Louisville	1	3	66

Unfortunately after a safety week many people are inclined to forget and go back to their old careless habits. The only way to gain safety is not to stop with a safety week. A safety campaign is needed throughout the year.

It is dangerous to forget.

Remember

1. It pays to look out for your own safety.
2. A good citizen works for the safety of others.
3. The streets are often as dangerous as a railroad track.
4. Boys and girls and grown-up citizens can make their community a safer place.

Write out a list of other things about safety worth remembering.

Safety Habits

1. Look in both directions before you cross the street.
2. Avoid getting off a moving car or vehicle.
3. Avoid catching on cars and wagons.
4. Always pick up broken glass and do what you can to make projecting nails less dangerous.

Name other habits that make for safety.

Things to Do

1. Find out what the traffic rules are in your community.
2. Discuss in your class the special dangers in your community.
3. Organize a safety-first club.
4. Think up a plan to protect the little children as they cross the street.

5. Have an honor roll in your room like the one in St. Louis.

6. Put newspaper clippings about accidents on a bulletin board.

7. Add to the list of common accidents found on page 176.

SPLENDID CITIZENS

"Let us fix this cellar door so nobody will be hurt"

8. Prepare a two-minute talk on safety.

9. Report accidents that your friends have told you about.

10. Have a column headed "Accident Report" on your bulletin board. For how many days, weeks, or months will it show no record of an accident's happening to anybody in the room?

11. Write safety slogans and jingles such as these:

When Mr. Careful comes to play, Mr. Careless runs away.

Take an ax to accident.

Preach safety first and practice what you preach.

A man at work is worth two in a hospital.

Jack be nimble,
Jack be quick,
But don't run around with a pointed stick.

If it's trouble you want to hatch,
Look for gas with a lighted match.

Little Jack Horner
Stood at the corner
Watching the traffic go by;
But when it had passed,
He crossed over at last
And said, "What a good boy am I!"

12. Write a play on safety first.

13. Make posters on safety.

14. Compose some safety songs.

15. Have a debate on safety. Use subjects like these:

a. Children should be allowed to play in the streets.

b. People should cross the street only at street corners.

c. All vehicles should come to a stop before crossing car tracks.

d. Large street signs should be prohibited.

16. Have a safety parade.

17. Plan a special safety week.

18. Invite somebody in your police department to speak to your school on safety.

Review and Thought Questions

1. What accidents may occur at home? at school? on the street?

2. How may children look out for their safety? for the safety of others?

3. What did the citizens of Omaha do for safety?

4. How did the children of St. Louis help to reduce the number of accidents?

5. What proof have we that most accidents are due to carelessness?

6. What is your city, town, or state doing for safety?

7. Which of the safety habits mentioned in this chapter do you think you ought to be more careful about?

8. What was the average reduction of accidents through a safety-week campaign in the cities mentioned in this chapter.

9. What are some of the common causes of fires?

10. Do you know how to turn in a fire alarm? Explain.

11. Just what would you do if your house caught on fire?

CHAPTER XVIII

WHAT TO DO IN AN EMERGENCY

Be Prepared. Lucine Cuny was a sixteen-year-old student at the Southwestern High School in Detroit. One day when she was diving off a springboard into the Detroit River she noticed that one of her companions was being carried downstream by the current. As she watched she saw him sink twice. He had struck his head against the bottom and had become dazed. He was nearly as large as she, but Lucine swam out to him promptly. After a desperate struggle she succeeded in dragging him in. On shore he was revived by his companions.

It was a brave act; but something more than bravery is needed at the time of an emergency. Knowledge and skill are required. Lucine Cuny was prepared for service, having earned a Junior Red Cross Life-Saving emblem.

Artificial Respiration. It is not often that one is called upon to restore respiration by artificial means, but sometimes it is necessary to save a person from drowning or from gas or automobile asphyxiation or from electric shock. If you are prepared to act you may be able to save someone's life.

The method now commonly used is the Prone Pressure Method. These are the directions furnished by the American Red Cross:

When a drowned person is brought ashore, don't wait for anything. If possible, send for a physician. But get to work, at once, with your own hands.

Lay the patient on his stomach. Extend one arm directly over the head. Bend the other arm at elbow, and rest patient's cheek on hand, to keep the nose and mouth off the ground and free for breathing.

LUCINE CUNY

Because of good training she was able to save a boy's life

Kneel, facing forward, and straddling patient's legs just forward of knees. Place palms of hands on each side of back, just above belt line, with your thumb alongside the fingers, the middle finger just touching the lowest rib, and the tips of fingers just out of sight. (Upper picture on page 185.) With arms held straight, lean gradually forward, pressing forward, down, and in on patient's back and counting slowly: one, two, three. Snap your hands sideways, off patient's back. Swing your body back counting slowly: four, five. (Lower picture on page 185.) Rest. Straighten arms, and repeat pressure.

Three movements: straight arm pressure, quick release,

swing back. Repeat these regularly at about five-second intervals, twelve times a minute. If you don't hear air drawn in when you snap off your hands, feel in the patient's mouth for obstructions such as a wad of tobacco. And unless a physician takes charge, keep up work steadily till breathing begins, and continues naturally. Then remove patient, on a stretcher and well covered, to a hospital or to his home.

Don't get discouraged. Stick to it, for three, even four hours if necessary.

In addition to the directions given above, experts in life-saving recommend that while one person is working for artificial respiration, another person apply warm bricks or bottles, dry the body as much as possible, and wrap the legs and lower part of the trunk with blankets.

Treatment for Common Poisons. People are often poisoned because they do not examine bottles before taking medicines from them. Every medicine bottle in the home or school should be labeled correctly and plainly. Bottles containing poison should have a special kind of mark to show that they are poison.

If some member of the family takes poison by mistake, remember to do these things:

1. Send for the doctor immediately. Tell him what the patient has taken.

2. If you know what the poison was and the antidote is given on the bottle, follow the directions given.

3. If you do not know what the poison was, try to produce vomiting. Running the finger down the throat

HOW TO SAVE LIFE BY RESTORING RESPIRATION
Courtesy of the American Red Cross

or drinking a large quantity of warm water will usually cause vomiting. Mustard and salt, a teaspoonful of either in a glass of lukewarm water, are also good emetics.

4. If the patient is drowsy, it is probable that he has taken opium. Keep him awake until the doctor arrives.

Fainting. In case of fainting let the subject lie flat. Do not raise the head. Loosen the clothing, especially around the neck. Give plenty of fresh air. Fanning is a help. A whiff of ammonia will bring back consciousness, but it is well to be in no hurry about restoring consciousness. Rub the limbs toward the body. Do not let the patient get up until he has recovered.

Overcome by Heat. In the very hot days of summer, people are sometimes overcome by the heat. If the person has fever, apply an ice cap to the top of the head. If the fever is 102 or over, put him in a cold bath and keep ice on the head. Judge the fever by taking the temperature. If no thermometer is at hand, judge it by the flushed face and the heat of the skin over the chest or the abdomen.

For heat prostration without fever apply cold to the head, but warmth to the remainder of the body.

To stop Nosebleed. Lean the head forward and shut off the nostrils with the forefinger and thumb. Hold the head in this position until the nose has filled with blood and the blood has clotted. Apply cold to the face or neck, or both, by means of an ice bag or cold cloths or ice.

Convulsions. Put ice or cold cloths on the head. Bathe the body and limbs in hot water. Put warm bags or bricks at the feet. Keep the person quiet and free from excitement.

Shock. Every serious injury is followed by what is known as shock. The ends of the nerves receive the blow and carry the message to the brain.

If you hit your finger with a hammer, you may feel sick for a moment. You feel weak, a clammy sweat breaks out on you, and you scarcely know what is going on around you. This is shock. Severely shocked people may be unconscious.

The best remedy for shock is heat. Apply it by means of hot-water bottles, hot bricks, hot blankets, or in any other convenient way. Apply it to the feet, legs, or back, or to all three.

To ease Spasmodic Pains. Take some preparation of benzyl benzoate. This is also of service in relieving irritating coughs. There are many of these preparations on the market. It is never safe to give opium, morphine, or any preparation containing any of these except under a doctor's direction, and not then unless the physician insists. So great is the harm done by morphine and opium that the evil they do outweighs the good, and the world would be better off if none of these drugs were produced.

To quiet Local Pain and Cramps. Apply a hot-water bag over the area of pain.

Ordinary Cuts and Wounds. The skin is a natural protection to the body. Any scratch or cut may be dangerous or even fatal if it is not properly cared for. Paint the wound with iodine and apply a clean bandage. One cannot be too careful to keep the wound and dressing clean.

TREATING A BURN WITH MELTED PARAFFINE

This keeps air away from the burn and relieves the pain. Moistened baking soda or vaseline serves the same purpose

Burns. The aim in the first treatment of burns should be to exclude the air. The picture on this page shows how that may be done.

Bruises. Often one falls or is struck without the skin's being broken, but the tissue underneath the skin is injured. Some of the tiny blood vessels are broken. The ordinary black and blue spot results. If the bruise is slight no treatment is necessary. If there is pain apply at once very cold or very hot cloths. Ice may be applied directly to the injured part.

Dangers from Carbon Monoxide Poisoning. Natural gas or manufactured gas is of great value today in cooking our food and heating our houses. At the same time, unless it is used properly it is very dangerous. When the gas is not burned properly, a deadly poison known as carbon monoxide is given off in the air. It is not easily detected because it is odorless, colorless, and tasteless. Carbon monoxide combines readily with the hæmoglobin of the blood and destroys its power to carry oxygen. It is this substance that is dangerous in ordinary illuminating gas, also in the "smoke" from automobiles.

This poisonous gas is especially likely to be formed

1. By pipeless heating stoves. The pipeless heating stoves are rather more dangerous than are the pipeless cook stoves.
2. During the first few minutes' operation of any hot-water heater.
3. When any flame is not supplied with enough air.
4. By coal stoves or furnaces that are not tight.
5. In exhaust gases from automobiles.

One overcome by monoxide poisoning should be treated by artificial respiration.

Remember

1. It pays to be prepared.

2. When an emergency occurs, keep cool and remember your training.

What other things do you remember?

Health Habits

1. Avoid danger.

2. Look at the label before taking medicine.

3. Send for the doctor when something serious happens.

Name other health habits.

Things to Do

1. Demonstrate artificial respiration.

2. Write to the American Red Cross for their pamphlet on Life-Saving Methods. Report on other details of life-saving not mentioned in this chapter.

3. Look over all the bottles in your medicine closet at home to see whether each bottle has a label.

4. Demonstrate other forms of first aid mentioned in this chapter.

5. Report on other ways of meeting emergencies not mentioned in this chapter. Read some books on first aid and emergencies.

6. Write to the *Red Cross Courier*, Washington, D.C., for some sample copies of this publication. Report on service rendered through first aid.

Review and Thought Questions

1. Why was Lucine Cuny able to save life?

2. Under what conditions is artificial respiration necessary? Report cases about which you know.

3. What is an antidote?

4. What emergencies are treated in this chapter? What is the best way to meet each one?

5. Why is carbon monoxide very dangerous? What precautions should be taken against it?

CHAPTER XIX

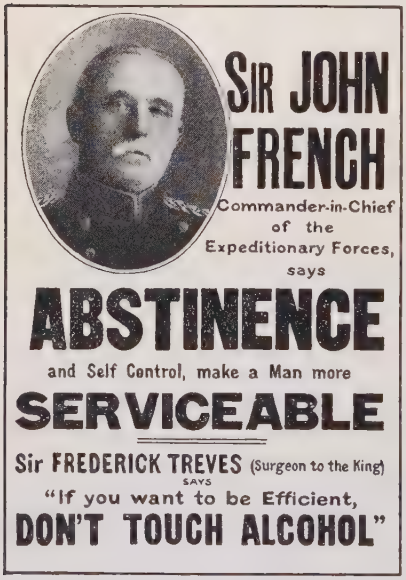
ALCOHOL AND TOBACCO — DANGER!

Alcohol an Enemy to Health and Success. In the early history of America the drinking of alcoholic liquors like hard cider, beer, whisky, brandy, and wine was common. It was thought to be helpful for both body and mind.

Gradually as people learned more and more about the effects of drinking they realized how injurious it was. The belief became widespread that it was harmful to the individual citizen and detrimental to the public good. In many cities, towns, counties, and states it became illegal to sell alcoholic drinks.

During the World War every one of the principal nations involved discouraged the use of alcohol because the making of alcoholic liquors required large quantities of grain that could be used for food, and also because alcohol made the soldier unfit to fight. The mine operators declared that one reason why they could not produce more coal was that the workers used drinks which contained alcohol. At last the United States government outlawed alcohol. An amendment to the Constitution of the United States made it unlawful to manufacture or to sell it.

Nobody who has examined the facts about alcohol would say honestly that alcohol is a friend to human beings. It is not only harmful physically and mentally but it is also a habit-forming drug. Many who begin to use it find themselves utterly in its power.


SIR JOHN FRENCH
Commander-in-Chief of the Expeditionary Forces, says
ABSTINENCE
and Self Control, make a Man more
SERVICEABLE
Sir FREDERICK TREVES (Surgeon to the King) SAYS
"If you want to be Efficient,
DON'T TOUCH ALCOHOL"

ONE OF THE ENGLISH WAR POSTERS
It appeals to the patriotic to abstain from drinking alcohol

A Dialogue between Science and John Barleycorn. Alcohol is often referred to as John Barleycorn. The most thorough knowledge of facts is called Science. Let us suppose that these two old-time enemies meet and have a discussion. John Barleycorn will lead; Science will reply.

JOHN BARLEYCORN. Science, you do me much harm by telling about the sorrow I bring to the world. People drink me and laugh.

SCIENCE. Quite so; but you cause more grief in the world than laughter. Think of those who laugh, but wake up with empty pockets.

JOHN BARLEYCORN. It costs little to drink.

SCIENCE. You must know that one of the chief causes of

poverty in the world is drink. The man who spends his money for liquor has less to put into the savings bank and less to spend on his home and family. For an investment I prefer the savings bank to the alcoholic drink.

JOHN BARLEYCORN. Speaking of an investment, do you not know that alcohol is a food?

SCIENCE. There is no general agreement on that point. Even those who believe it to be a food can claim nothing for it except fuel value. It may supply a small amount of heat and energy, but unlike milk it cannot build up the body. Milk is a real food. It supplies heat and energy and in addition makes bone, muscle, and blood without any harmful effects. Alcohol is a poisonous drug and is injurious to the body. Even Dr. Atwater, who showed that alcohol in very small quantities might take the place of food, condemned its use as a food because of its expense and possible ill effects on the nervous system.

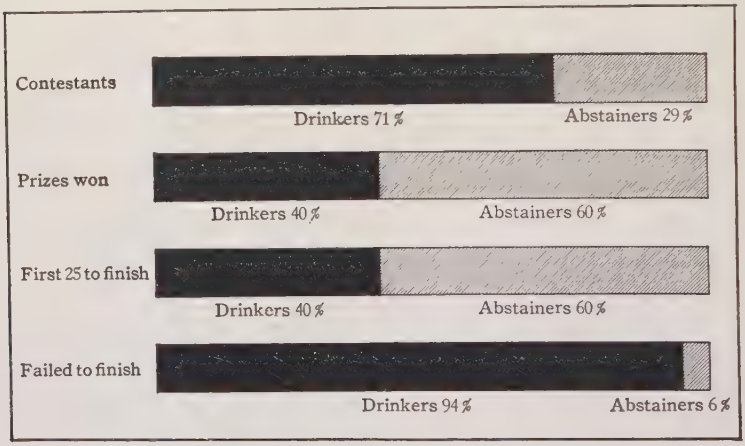
JOHN BARLEYCORN. Alcohol is said to make one much more alert in the handling of his muscles.

SCIENCE. This is untrue. You know of the test by Dr. Walter Miles. He made a pursuit pendulum. This was a swinging pendulum which contained a leaky reservoir of water. This leaky pendulum was made to swing above a sink. The game was to catch with a cup as much of the water as possible by following the stream back and forth. Dr. Miles discovered that when one tried to do this both before and after drinking alcohol, he always caught less after drinking alcohol. There are many other tests that show how alcohol decreases the precision and steadiness of movement.

JOHN BARLEYCORN. Many persons who drink alcoholic liquors think that it helps them to control their minds.

SCIENCE. You are a great deceiver. Who ever heard of your

helping anybody to drive an automobile better? This requires alertness of both mind and body. Any city or town will tell you that you are one of the commonest causes of automobile accidents. In the factories it has been found that workmen



THE STORY OF A WALKING MATCH

It was open to all German athletes. Eighty-three took part in this sixty-two-mile walk. No alcohol was used on the march. The first four to finish were abstainers. Tell more of the story by studying the diagrams above

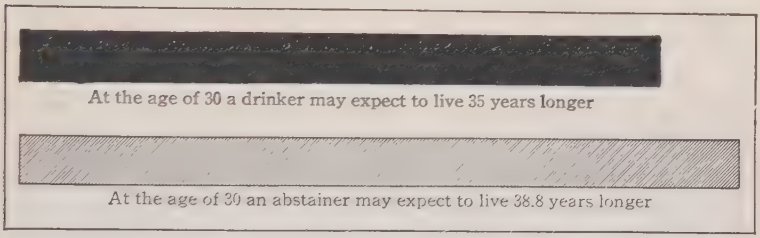
who are sober have fewer accidents than those who drink. Alcohol dulls our senses and our alertness in perceiving danger. It causes unsteadiness of hand and foot.

JOHN BARLEYCORN. You forget I am used as a medicine.

SCIENCE. You may be helpful sometimes, but only when a physician advises. You are now known as a narcotic, something that deadens the nervous system, not a stimulant. Every hospital is using less alcohol every year.

JOHN BARLEYCORN. Strong liquor prevents disease.

SCIENCE. There is no proof for that. Consider pneumonia. Dr. Osler and Dr. McCrae found that only 18.5 per cent of total abstainers who got pneumonia died, but 25 per cent of the moderate drinkers and 52.8 per cent of the heavy drinkers died.


At the age of 30 a drinker may expect to live 35 years longer
At the age of 30 an abstainer may expect to live 38.8 years longer

INSURANCE RECORDS SHOW THAT IF A MAN DOES NOT DRINK HE MAY EXPECT TO LIVE LONGER

JOHN BARLEYCORN. Do I not help in making people healthy? in lengthening life?

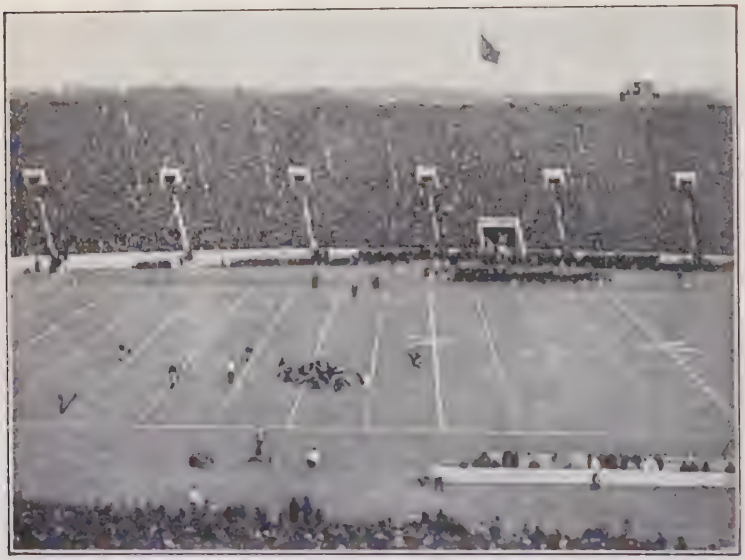
SCIENCE. Again there is no proof of that. Fortunately we have a good many facts that show how deadly is the effect of alcohol on the human body.

For sixty years the United Kingdom Temperance and General Provident Institution has had a separate section for abstainers. Its books show that drink shortens life considerably. At 30 years of age the average insured drinker may expect to live 35 years longer, whereas the average insured abstainer may expect to live 38.8 years. At 40 years of age the average insured drinker has 27.3 years of life before him, whereas the abstainer has 30.3 years. The advantage in favor of the abstainer is 11 per cent.

JOHN BARLEYCORN. I fear you know too many facts, Science, for me to argue with you. There is just one thing that I am afraid of.

SCIENCE. What is that?

JOHN BARLEYCORN. I am afraid of the education of the young. If they can be kept in ignorance of all the facts—that I do not help them to get or keep a job, do not make them strong, do not help them on the athletic field—perhaps they will learn to like me. Then they will be in my power.

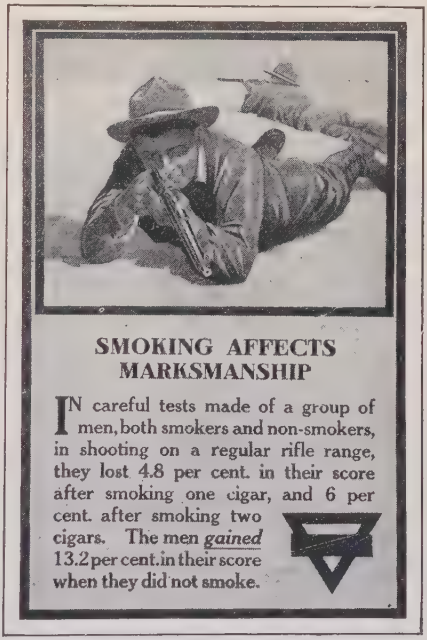


ATHLETES MUST HAVE GOOD HABITS

Football players do not use alcohol or tobacco when they are in training. Both of these are a handicap in every form of athletics

SCIENCE. For once you are speaking the truth, John Barleycorn. You may well fear education. As our boys and girls find out that you are a poison and an enemy of mankind they will leave you alone. Knowledge will always be your enemy, for the facts prove that good health habits make happy boys and girls and fine men and women.

Tobacco an Enemy of Youth. There is no scientific evidence to show that the body needs tobacco or that tobacco is at all conducive to health. Those who have made a very thorough study of the effects of the use of tobacco on the mind and body are all agreed that while in adult life the moderate use of tobacco may not result in serious harm, tobacco is always likely to prove injurious to children and young people.


SMOKING AFFECTS MARKSMANSHIP
IN careful tests made of a group of men, both smokers and non-smokers, in shooting on a regular rifle range, they lost 4.8 per cent. in their score after smoking one cigar, and 6 per cent. after smoking two cigars. The men gained 13.2 per cent. in their score when they did not smoke.

THIS POSTER SHOWS ONE OF THE BAD EFFECTS OF SMOKING

Here are some of the principal reasons why smoking is bad for young people:

1. Smoking tends to stunt growth.

2. Tobacco smoke is always an irritant to the mouth, throat, and lungs.

3. Tobacco is harmful for athletes.

4. The use of tobacco often leads to a disregard for ordinary politeness. Smokers sometimes use tobacco in the presence of those who find tobacco smoke very offensive.

5. The use of tobacco in any form is expensive.

6. The habit is a luxury, since it is quite unnecessary.

7. When the tobacco habit is once formed, it is hard to break. The smoker is likely to become its servant and slave.

Remember

1. Alcohol is a poison and a habit-forming drug.

2. It is a narcotic, not a stimulant, and dulls the action of the brain.

3. Alcohol interferes with self-control.

4. It is responsible for many accidents.

5. Alcohol is a cause of poverty.

6. There is no evidence to show that alcohol ever helps youth to be successful.

7. Tobacco contains a poison called nicotine.

8. Good athletic teams refrain from using tobacco.

9. The use of tobacco is a waste of money.

What other important facts do you remember?

Health Habits

1. Leave alcohol and tobacco strictly alone.

2. Avoid all drug habits.

Things to Do

1. Write to some great athletes in your state to find out whether they recommend the use of alcohol and tobacco for those who wish to excel in athletics.

2. Write to several large business establishments, including a railroad, to find out whether they prefer the abstainer to the drinker.

3. Appoint a committee to interview several physicians in your community on the effects of alcohol on the human body.

4. Write a dialogue between Science and John Barleycorn. Use some facts not given in this chapter.

Review and Thought Questions

1. Why was the use of alcohol discouraged during the World War?

2. What is the danger in a habit-forming drug?

3. What were the points made by Science in arguing with John Barleycorn?

4. Does the use of alcohol result in real happiness? Explain.

5. How would you prove that the drinking of alcohol means the loss of money?

6. Would you trust the skill of a chauffeur who drank habitually? Give reasons for your answer.

7. What is the difference between alcohol and milk as foods?

8. What do experiments like that of the pursuit pendulum show?

9. What is the average length of life of the abstainer compared with that of the drinker, according to the life-insurance companies.

10. What are the arguments against tobacco?

CHAPTER XX

UNSEEN FRIENDS AND ENEMIES

Life under the Microscope. One of the greatest inventions of modern times was the improved microscope. It told man a wonderful story of a new world of which he had not even dreamed. A drop of water in the mill pond, near the lily pads, might look as clear as a crystal. Seen under a powerful microscope it was found teeming with vast numbers of minute plants and animals. For many years these new forms of life were looked upon as mere curiosities. They were so small that it would take many trillions to weigh just one ounce. Nobody dreamed at first that they had anything to do with the success and failure of human beings.

Our Unseen Friends. We now know that many of these microscopic forms of life are very helpful to man. Probably one could never sit down at the table without acknowledging that some of these unseen friends had had something to do with the preparation of the meal. There is mother's fluffy, delicious bread. What makes it so light? Along with the flour, milk, salt, butter or lard, and sugar mother added some yeast. The bit of yeast was a hardened cake containing some living yeast plants

invisible to the naked eye. When the yeast plants have moisture and warmth, they begin to multiply rapidly. They change the sugar into alcohol, which escapes when the dough is baked, and also into carbon dioxide gas. This gas fills the dough and makes little cavities in the bread. In this way the bread is made light.

Many such microscopic organisms are called bacteria. We need them in our industries. Ordinary cheese, butter, vinegar, and other articles of diet could not be produced without the aid of these unseen friends.

LOOKING AT A WORLD INVISIBLE TO THE UNAIDED EYE

Without the help of these microscopic plants the larger plants which furnish us food would not be able to grow. The bacteria cause the decay of bodies of plants and animals so that they can be used by growing plants. They also take the nitrogen out of the air and the soil and change it to such a form that it can be taken up by growing plants. Bacteria helped to wear down the rocks and build up the soil so that it could be used for gardening and farming.

It is safe to say there is no food that comes to our table and no manufactured product that comes into our houses in which these unseen friends have not helped in some way.

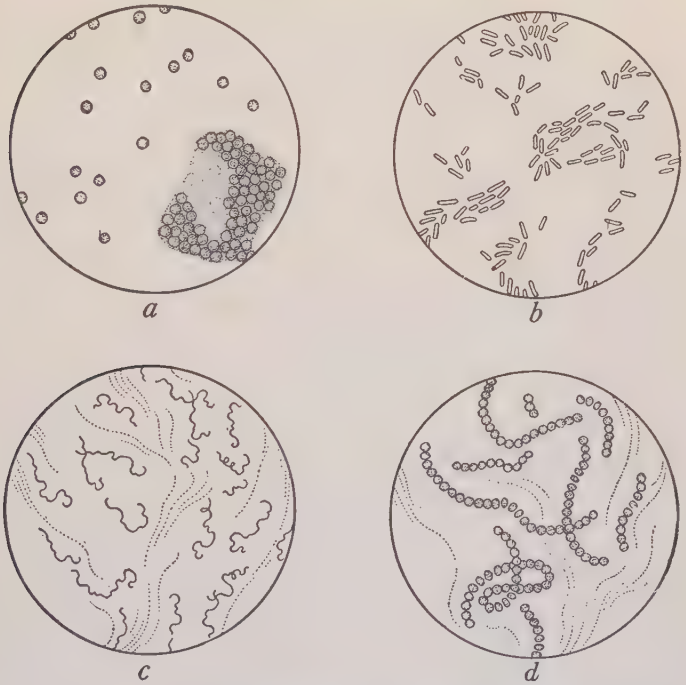
Our Unseen Enemies. Bacteria are found everywhere —in the soil, the water, the air; in our food, on our skins, and in our mouths. While some of them are our friends, others cause disease. But among the many thousand kinds of bacteria there are only a few varieties which are responsible for sickness. In addition to the vegetable forms of life called bacteria there are some animal forms of microscopic life which are dangerous. One of these is the cause of malaria. The word "germ" or "microbe" is a general term referring to both vegetable and animal forms of microscopic life.

YEAST CELLS

Some of the bacteria bear names which are given them because of their shape: *cocci*, because they are round; *streptococci*, because they are round and in chains; *bacilli*, because they are rods; *spirilla*, because they are spirals.

Fighting our Foes. Usually the bacteria which cause disease cannot live outside the bodies of animals or men. Some of them can live only in the bodies of human beings.

Even bacteria which live in the body may not cause disease; they may live on the body as moss lives on a tree.



THE MICROSCOPE SHOWS MANY CURIOUS FORMS OF LIFE

Some of them are (*a*) round; others are (*b*) rod-shaped; (*c*) spiral-shaped and (*d*) round and in chains

Since some of these bacteria are unfriendly, we need to know how to fight them. Extreme heat kills germs. In addition to making food more palatable, cooking is a means of defense against bacteria. To boil drinking-water

is a certain way of making sure that it will not carry disease. Another way in which we defend ourselves is by refrigeration—freezing, or keeping things cold. The reason why meat and milk spoil in a warm atmosphere is because warmth favors the growth of germs. Cleanliness is another protective measure.

Sunlight is one of the best friends of man, because harmful bacteria cannot live long when exposed to it.

Remember

1. There are many forms of life visible under the microscope.
2. Most of them are friendly: they help to prepare our food.
3. Some of them are unfriendly: they cause sickness.

What other facts do you remember?

Health Habits

1. Wash your hands thoroughly before eating.
2. Keep your fingers out of your mouth.
3. Keep lead pencils out of your mouth.
4. Buy clean milk.

What other health habits can you suggest?

Things to Do

1. Bacteria reproduce themselves by cell division. See page 18. Under favorable conditions one of the bacteria would in fifteen minutes be two bacteria; in thirty minutes these two would be four, etc. Figure out how long it would take one bacterium in a bottle of milk to become a million.

2. Make some bread dough with yeast and some without yeast. Let it stand overnight; then notice the difference between the two batches the next morning.

3. Ask somebody from a neighboring factory to tell the class about the unseen bacteria that help in the work of the factory.

4. Examine some yeast or mold with a magnifying glass or a microscope.

5. Study the pictures of bacteria on page 203 and explain what you see.

Review and Thought Questions

1. Why was the invention of the microscope so important?

2. How are many bacteria helpful to man?

3. Do you know of other ways not mentioned in this chapter in which bacteria are friendly to man?

4. How may bacteria be harmful?

5. When canned fruit begins to "work," or spoil, why will reheating and recanning the fruit often save it?

6. Why do you think a surgeon boils his instruments? What is the danger in picking a sore? It is sometimes said that finger nails are poisonous. Do you think so? Why?

7. Why is it a good plan to flood a bedroom with sunlight?

8. What ways of protecting ourselves against bacteria are mentioned in this chapter?

CHAPTER XXI

HOW THE BODY PROTECTS ITSELF

The Protection of the Skin. Although the bacteria in the world around us are very numerous, few of them really get into the body. This is because the body has many ways of protecting itself.

One of its very best protectors is that close-fitting garment called the skin. It is almost impossible for bacteria to get through the skin unless there is a cut or scratch. When the bacteria get into an opening in the skin, they may cause it to be very sore. Then it is said to be infected. It is easy to see the importance of keeping dirt out of any kind of wound, no matter how slight it may be.

In those places where there is likely to be so much rubbing that the cells would be worn off, the body builds up a many-layered wall of flat cells, like a brick wall, that the bacteria cannot penetrate. This is true of the tongue, the mouth, and the esophagus.

Guards of the Breathing Passages. Every opening into the body offers a chance for infection. One of the most important of the entrances into the body is the nose. Through this opening we are breathing in great quantities of air day and night. Sometimes the air is dusty and dirty

and contains bacteria. The hairs in the nose strain out many of these impurities. If the dust and bacteria succeed in passing into the windpipe or bronchial tubes, they meet other guards. These are tiny microscopic hairs called cilia, which stand up like stalks of oats. Under the microscope the surface looks like an oat field. These cilia wave just as an oat field will when blown by the wind. The difference is that the cilia always wave in one direction, toward the outside opening, the nose or mouth. These waves carry dirt and bacteria gradually to the outside.

They carry the thick phlegm from the lungs up into the throat and make it easy for a light cough to throw it out. That is why doctors advise people not to cough hard. If they will wait a little while in spite of the tickling, these waves will get the phlegm to a place where an easy cough can raise it.

The Protection of Fluids. Many of the fluids of the body are enemies of the bacteria. They help to wash the dirt and bacteria away. That is why a wound that bleeds and oozes is less likely to be poisoned than a dry one would be. Another good example of the protection by fluids is the eye. Although the eye is exposed to dust and is often rubbed by soiled fingers, it seldom becomes infected because it is constantly washed by the tears. Not only the tears but the saliva and many of the digestive juices are mildly antiseptic, or harmful to bacteria.

THE FIGURES IN THIS HEALTH PARADE WERE CUT OUT OF WHITE PAPER AND CAREFULLY PASTED ON A LONG SHEET OF BLACK PAPER

White Blood Corpuscles Policemen. The few bacteria that do make their way into the body find it hard to get along. All the cells in the body have some power to protect themselves, but some are better fighters than others. The different cells are so busy doing their own work secreting bile or gastric juice or pumping blood that it is a very great help to have special police cells to fight the bacteria. The principal police cells are the phagocytes, or white blood corpuscles. They are valiant soldiers. If a splinter goes into the flesh and the wound becomes infected, the white corpuscles rush to the place of danger to devour the invaders. What we call pus is made up of those white corpuscles that have been killed in their fight with harmful bacteria.

Other Foes of Sickness. When the bacteria find their way into the body, they manufacture a poison called a

BOYS AND GIRLS AT HAVERHILL, MASSACHUSETTS, MADE THE POSTER. WHAT DOES THIS PARADE TELL? WHAT KIND WILL YOU MAKE?[1]

toxin. This poison tends to make us ill. When we have a sore throat, and our heads begin to ache and our foreheads feel hot, it is because of the poisonous toxin that is being manufactured by the bacteria in the throat. Poisoning by the toxins is also the cause of the fever in some diseases. Not only the white blood corpuscles but all the cells of the body work to combat these toxins.

The cells at work manufacture substances called antibodies that destroy the bacteria and make the toxin harmless. One of these helpful substances that we hear most about is called antitoxin. When the body makes enough of these antibodies, the invading bacteria are destroyed, the fever disappears, and the illness is over.

[1] The above pictures of the health parade are reproduced here through the courtesy of the Massachusetts Tuberculosis League.

Some persons do not catch colds or disease because they have naturally great resistance. They are then said to be immune. Frequently one does not have the same illness twice because the body still has so many antibodies that

HEALTHFUL EXERCISE

Play in the open air helps us to keep physically fit. (Courtesy of the Playground and Recreation Association of America)

it is well protected. When the power to throw off smallpox and typhoid fever has been acquired, it sometimes lasts throughout life. This power is called immunity.

Keep Physically Fit. The body is well prepared to fight the harmful bacteria, but it is necessary for us to keep it in fighting trim. Keeping the body in good health all the time is one of the best ways of preventing disease. This

means eating plenty of nourishing food, getting plenty of sleep, avoiding fear or worry, gaining in weight, and forming all other health habits.

Remember

1. The body leads a splendid fight against microbes.
2. The skin protects the body.
3. The white corpuscles are excellent fighters.
4. Cooking food is a protection against disease.
5. Sunshine kills germs.

What other important things do you remember from the reading of this chapter?

Health Habits

1. Avoid scratching or breaking the skin.
2. Keep cuts and scratches clean.
3. Cough lightly.
4. Rinse fruits in clean water before eating them raw.
5. Keep physically and mentally fit.

What other health habits would help you fight the enemies of the body?

Things to Do

1. Examine the bark on a stick. Compare it with the skin.
2. Find under the microscope forms of life not seen by the unaided eye.

Review and Thought Questions

1. How does the skin protect the body?
2. What may happen when the skin is broken, especially if we are not careful?

3. What protects the air passages?
4. How do fluids help?
5. What do the white blood corpuscles do?
6. What are the other foes of sickness?
7. What do you mean by toxin? by antitoxin?
8. What is immunity?
9. How does one become immune?
10. How does keeping fit protect us against sickness?

CHAPTER XXII

TWO HEALTH HEROES

Curious Ideas about Illness. From the earliest history man has fought disease. The fight was not always successful because he did not know the cause of illness. Often he held evil demons responsible. Some men taught that all the joys and ills of life were due to the position of the heavenly bodies. Pestilence was believed to come from spots on the sun. Even our own Noah Webster, who wrote the dictionary, penned two volumes to prove that earthquakes and other physical disturbances caused epidemics. Some illnesses were said to be due to vapors that arise from the earth. Even the direction of the wind was thought to determine sickness and health. Most of these curious ideas were common not more than fifty years ago. As long as the real cause was unknown little could be done to prevent and cure disease.

Pasteur, Friend of Animals and Men. The man who overturned these absurd notions and gave us a scientific basis of medicine was Louis Pasteur. It was largely because of his scientific work that man has celebrated one victory after another over disease. It was Pasteur's belief that science would finally conquer all disease.

Very early in his work Pasteur showed that fermentation such as is found when canned fruit "works" was caused by bacteria. As a result of this discovery he was able to make other discoveries which greatly helped in the production of vinegar and wine. It was Pasteur who found that the souring of milk was caused by a particular kind of bacterium and that the heating of milk to a certain point would free it of disease-producing bacteria. This process is now called pasteurizing, in honor of its founder.

LOUIS PASTEUR
The founder of modern medicine

Pasteur was the first man to prove the practical value of the germ theory. Pasteur's aid was next sought to save the silk industry, which was threatened with extinction because of the extraordinary mortality of the silkworms. After a long and laborious search Pasteur found that the silkworms had been destroyed by two microscopic organisms. The silk industry was soon saved, simply by selecting the eggs of healthy worms for breeding and destroying the others. Pasteur had saved one of the great industries of France.

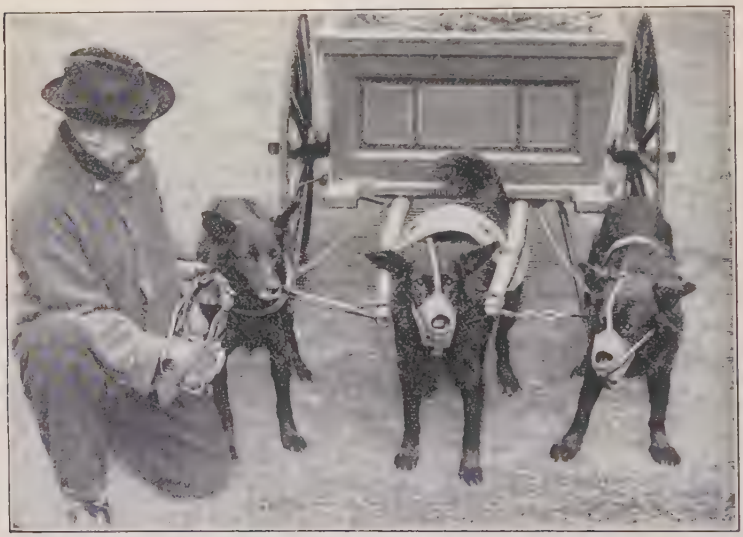
One of Pasteur's greatest achievements was the conquest of anthrax. This is a very ancient disease, fatal to men as well as to cattle. At that time it was destroying herds of sheep and cattle in France and also many human lives. In 1880 Pasteur announced that he had discovered a way to make animals immune to a disease by introducing into their blood some of the weakened germs of the disease. The next year he announced that sheep and cattle could be protected against anthrax by this method.

The president of an agricultural society suggested that there should be a public test. He offered to furnish a drove of fifty sheep, half of which were to be inoculated with the weakened anthrax germs. Later all the sheep were to be inoculated with the strong or virulent anthrax germs. Two goats were finally used instead of two of the sheep, and ten cattle were added. The first preventive inoculation with the weakened anthrax germs was on May 5, and the second on May 17. Twenty-four sheep, one goat, and six cattle were given these inoculations. On May 31 all sixty of the animals were inoculated with powerful anthrax bacteria. The animals were then left in an inclosure to await the result of the test.

On June 2 a vast crowd gathered to see the results of the experiment. It was a dramatic moment. All the animals that had not been given the preventive inoculation lay scattered about the inclosure dead or dying, while those that had been protected walked around

unconcernedly in perfect health. All France rang with the praises of Pasteur. He became a great national hero.

That day marked a new era in medicine. Pasteur had saved a great industry. Chicken cholera and the swine



THE MUZZLED DOG IS SAFE

plague were other diseases of animals that he later investigated with success. Pasteur had proved himself a friend of animals. It only remained for him to apply his knowledge to human beings.

Protection against Rabies. The first opportunity to try protective medicine on man came about quite unexpectedly. Pasteur had experimented in his laboratory with the dread disease called hydrophobia, or rabies,

usually transferred by bites of dogs. He discovered that when dogs were inoculated with the weakened germs of the disease, they would become immune to rabies. The weakened germs led the body to manufacture antibodies. It took about fifteen days to make a dog immune. Since the malady does not develop in man until a month after he is bitten, it looked as if a human being might be treated after being bitten and made immune. Pasteur hesitated to try this treatment on man. He shrank in terror from the thought.

Finally one day Joseph Meister, aged nine, came with his mother to visit Pasteur. The little boy had been dreadfully bitten by a mad dog, and Pasteur was implored to give help. After much anxious thought he decided to give him treatment. It was a success, and other successes followed.

Because of Pasteur's teaching we are now able to protect ourselves against rabies. In many communities dogs are not allowed on the street unless they are muzzled. In every case when a child has been bitten, the dog should be confined and watched to find out whether he shows any sign of disease. If he does, the Pasteur treatment should be given the child at once. Children should be careful in playing with dogs not to tease or irritate them. Beware, too, of petting stray dogs.

Pasteur a Health Hero. On December 27, 1922, the entire civilized world celebrated the hundredth anniversary

of the birth of Louis Pasteur. His name was honored because of his great service to mankind. Much of medical science today depends on his discoveries.

During Pasteur's life many honors were paid him. He was made a member of many learned societies, and the Czar of Russia conferred upon him the diamond cross of the order of St. Anne of Russia.

JOSEPH LISTER

He made modern surgery possible

Lister a Health Hero. The great discoveries of Pasteur concerning the relation of disease to bacteria appealed to the imagination of a very noted English surgeon, Sir Joseph Lister. He reasoned that if bacteria were the cause of diseases, they were probably also the cause of the formation of pus and blood-poisoning after a wound. If drugs could be found to kill the bacteria, and other germs could be kept out, wounds would heal readily. This thought brought about a revolution in hospitals. Carelessness gave way to great cleanliness, and surgery became much more successful than it had ever been before.

Remember

1. Pasteur was the founder of modern medicine.
2. He was the friend of both animals and men.
3. Sir Joseph Lister made surgery safe.

What other important facts do you remember from your study of these two health heroes?

Health Habits

1. Keep clean.
2. Be helpful.

Things to Do

1. Tell the story of Pasteur.
2. Look up more facts on the life of Pasteur and his service to mankind.
3. Write a play with Joseph Meister as one of the chief characters.
4. Tell the class the story of Sir Joseph Lister.
5. Find more facts about Lister's life.

Review and Thought Questions

1. What were some of the early ideas about the cause of disease?
2. Why did people of long ago meet with so many failures in fighting disease?
3. What proof have we that Pasteur was a friend to animals as well as to people?
4. What episode in Pasteur's life was most interesting to you? Why?
5. How was Pasteur honored for his service to the world?
6. How can we protect ourselves against rabies?
7. Why may we think of Lister as a health hero?

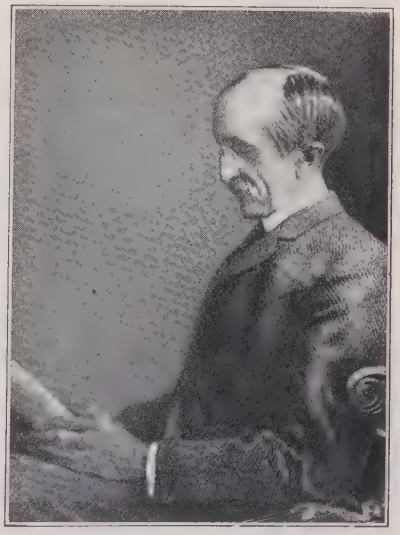
CHAPTER XXIII

TRUDEAU'S GREAT VICTORY

The Story of Dr. Trudeau. Few men have been so helpful to the world as Dr. Edward Livingston Trudeau. At the age of twenty-five he discovered that he had the dread disease called tuberculosis. Nobody knew of a cure for it, and his friends gave up all hope of his recovery. Before this, life had looked very bright. He was ready to take up his life work as a physician. He now found himself ill, his future doubtful, and a family dependent upon him. But Dr. Trudeau was a brave man. Instead of giving up hope he made a wonderful fight for his life, won the battle, and taught the world one of its finest lessons.

Dr. Trudeau had always loved the Adirondack Mountains. He now longed for the quiet of God's great out of doors. Finally, he took up his abode with his family at Lake Saranac, New York. It was far away from the comforts of civilization and in a region so cold that the thermometer sometimes went down as low as 40 degrees below zero. Most of Dr. Trudeau's friends advised against his going, but he went. He took plenty of rest and sleep and ate nourishing food. In the years that followed he spent much of his life hunting and fishing in the open air. Then

a most wonderful thing happened. He began to recover from tuberculosis, and finally became well enough to live to a ripe age. As he gained in health he began to practice medicine among the humble folk of the vicinity. He did not ask for fees. Because of his lovable nature and his desire to help others he was called by many "the beloved physician."

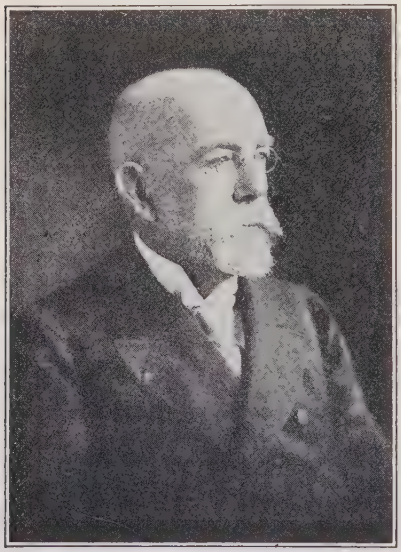


DR. TRUDEAU, THE BELOVED PHYSICIAN

His victory over tuberculosis has saved thousands of lives

One day, while waiting for foxes on a fox-run, he fell asleep, leaning on his gun. As he slept he dreamed that the side of the mountain at Lake Saranac was dotted with beautiful cottages built inside out. It seemed as if the people who inhabited them lived on the outside, where they could breathe plenty of fresh air. That dream came true. Through the hard work and patience of Dr. Trudeau the splendid buildings of the sanitarium at Lake Saranac were erected. He had proved to the world that tuberculosis could be cured. Today there are several

hundred hospitals and sanitariums in America that owe their beginning to Dr. Trudeau, and thousands of people who would not be alive today except for his great lesson.



DR. ROBERT KOCH

The scientist and physician who discovered the tubercle bacillus and so made possible the successful war now being carried on against tuberculosis

Nature of Tuberculosis. The disease over which Dr. Trudeau won his victory is caused by the tubercle bacillus. Under the microscope it looks like a tiny rod. This bacillus will not grow and multiply outside the bodies of animals, but it differs from all others in that it can and does live in all known large animals. It is found in man, cows, hogs, monkeys, and lions, and even in such cold-blooded animals as turtles and snakes. In man it locates itself in the lungs, causing consumption, or in the bones, causing hunchback, or in the glands, causing scrofula. People sometimes get it by drinking milk from tuberculous cows.

Dr. Trudeau and other physicians have proved that tuberculosis is due to faulty customs and habits.

Spitting, a Filthy Habit. One of the most disgusting and dangerous habits is that of spitting in public places. One reason why this is dangerous is that sputum, or spit, sometimes contains the disease germs of tuberculosis, pneumonia, measles, common colds, and other diseases. The sputum may dry and be breathed in, causing sickness. Because spitting is dangerous to the public, laws have been passed prohibiting it. Coughing and sneezing without covering the mouth with a handkerchief or napkin is another way of spreading disease, for the sputum is sprayed into the air and breathed in by other people.

The consumptive should be especially careful about his sputum, because it contains tubercle bacilli. He should spit into a paper and burn the paper. If he spits into a handkerchief, he must boil the handkerchief as soon as possible. Soiled handkerchiefs in the pockets or in the hands may cause trouble.

Enjoy Sunshine and Pure Air. Consumption is a house disease. People who live in the open air seldom have it. In the days when the Indians were savages and lived in their crude wigwams and hunted through the forests and over the plains, consumption was almost unknown. As soon as they began to live in houses, like white men, they began to have consumption. Sunlight and fresh air, as Dr. Trudeau discovered, are necessary for protection against this disease. It is always found to develop in

abundance among people who live in dusty air. The dusty trades are those in which the workers have a high death rate from consumption.

What is true of man is largely true of animals. Whenever cows live on the range they have no consumption, but

SUNSHINE MAKES HEALTHY BOYS AND GIRLS

These children are regaining their health by exposing their bodies to air and sunlight

when they are kept in warm barns they develop the disease. Dr. Trudeau found that rabbits inoculated with tuberculosis recovered in the open air, but speedily became sick and died when confined indoors.

All this goes to show that dirt, dampness, and darkness

are three of the most active friends of the tuberculosis germ. Where they are found the germ is apt to flourish. Sunshine, pure air, and cleanliness are its greatest enemies. Sunshine and fresh air are the best of medicines.

FRESH AIR MAKES SICK CHILDREN WELL

Health Crusaders Forward! Dr. Trudeau and others have taught us that consumption not only can be cured but also may be prevented. The war against consumption has meant one victory after another. It used to be called the Captain of the Hosts of Death because so many people died of it; but every year we hear the wonderful story of the ever smaller number of people who have it and the

larger number who recover. Within the last twelve years the death rate from tuberculosis in New York City has been reduced 50 per cent. One reason why this war is so successful is that people, especially children, are forming good health habits.

The National Tuberculosis Association has over seven million children in America enrolled as Health Crusaders. By doing the health chores (see page 12) they are helping to make consumption disappear. Not only in America, but also in far away Japan and Australia and other distant lands, children are fighting in this great war. Anybody who keeps the laws of health is helping the good work along.

To avoid Consumption

1. Drink milk from healthy cows.
2. Live in the open, fresh air as much as possible.
3. Avoid poorly ventilated rooms of all kinds.
4. Sleep in a well-ventilated room or on a sleeping-porch.
5. Work and play in a place where the air is clean and pure.
6. See that your schoolroom is well ventilated.
7. Do not spit on the floor or allow others to do so.
8. Avoid close contact with consumptives, especially during your years of childhood.
9. Drink plenty of milk and eat nourishing foods.

10. Do not neglect colds and coughs.

11. Avoid getting the feet wet and becoming chilled.

12. Do all the health chores of the Modern Health Crusaders.

Remember

1. Dr. Trudeau was a hero and a good citizen.

2. Tuberculosis is being conquered every day.

3. Forming health habits will banish tuberculosis from the world.

What other facts do you remember from the reading of this chapter?

Health Habits

1. Sleep with your windows open.

2. Drink a quart of milk every day.

3. Keep your weight up to normal.

4. Avoid spitting.

5. Live in the open air.

Name other health habits that will help you to prevent tuberculosis.

Things to Do

1. Tell the story of Dr. Trudeau.

2. Report to the class other incidents from Dr. Trudeau's life. The story of his life is told in "The Beloved Physician," by Stephen Chalmers (Houghton Mifflin Company), and in his autobiography, published by Lea and Febiger.

3. Write a health play, telling briefly the story of Dr. Trudeau's life. In it dramatize the vision of Dr. Trudeau on the fox-run.

4. Write to the secretary of your state board of health for information about the victory over tuberculosis in your state. What led to the victory? Does your state have a sanitarium? Find out all you can about it.

5. At Christmas time volunteer as a class to sell the seals from which the profit is used to fight tuberculosis. This is one way to help others. If these seals cannot be secured in your community, write for information to the National Tuberculosis Association, 370 Seventh Avenue, New York City.

6. Make a list of all the things we can do to avoid tuberculosis.

Review and Thought Questions

1. How did Dr. Trudeau win a victory over tuberculosis?
2. What is the cause of tuberculosis?
3. Why is spitting a bad habit?
4. What has housing to do with the prevention of tuberculosis?
5. How are the Health Crusaders helping to defeat tuberculosis?
6. How else does life in the open air help us to be healthy and strong?
7. If cows are shut up in dark, close stables, do they develop tuberculosis? Why?

CHAPTER XXIV

AWAY WITH COLDS

Colds scarce at the North Pole. It is not easy to explore the frozen North. To do this a ship must be built that can force its way through the drifting fields of ice. There is the long arctic night of six months and the intense cold, when the thermometer falls as low as 80 degrees below zero. When the long night is over there is a dash on sledges drawn by dogs across hundreds and sometimes thousands of miles of a dangerous world of ice and snow.

We might think that one of the dangers in making a dash for the pole would be colds and pneumonia, but this is not so. The explorers rarely have colds when they are far away from civilization. Colds begin just as soon as the men reach those settlements where people live in houses and where colds and pneumonia are common. The explanation is this: we do not catch colds from ice and snow and cold weather, but from *people*. Since people are scarce in the Far North, colds are almost unknown.

The Cause of Colds. Common colds, sore throat, and pneumonia are caused by bacteria that reside in the air passages. These bacteria, which usually begin in the nose, are likely to travel to the sinuses (large cavities in

the bones of the skull) and to the ears and eyes, or they may pass down to the throat and the lower air passages, causing laryngitis or bronchitis. The common name for bronchitis is "cold on the chest." Sometimes a cold ends with pneumonia, or inflammation of the lungs.

THE EXPLORER IN THE FROZEN NORTH SELDOM HAS COLDS

The bacteria which cause these troubles may be breathed in through the nose, but they may get into the mouth by way of the hands or of knives and forks which have not been properly washed and rinsed. The mist which is thrown into the air by coughing and sneezing is just as likely to carry bacteria as the sputum which one coughs up. Therefore, in coughing and sneezing, one should hold a cloth or paper in front of the mouth or nose. If nothing else is convenient, the hand may be held there, but it should be washed as soon afterward as convenient.

Since people carry colds, it is a good plan to stay away from everybody who has a cold. When children have colds it would be better for them and for their schoolmates if they stayed at home. If children with colds stayed at home they might rest, sleep, and get plenty of fresh air. Then they would recover much quicker, and if they were not in school the other children might not catch the cold.

CARRYING A CLEAN HANDKERCHIEF HELPS TO PREVENT COLDS

Protection against Colds in Winter. There are few colds in summer. The principal reason is that people work and play out of doors and have the windows of their houses open more than in winter. Living close together indoors in winter is the most common cause of colds.

As soon as the windows are closed in the fall the common cold begins. It continues without interruption until spring comes and people again spend much time in the open air. Both colds and pneumonia are most prevalent in the colder months of winter.

To protect oneself in winter against colds it is necessary to keep in the best of health. The practice of the health chores is essential. One of the very best preventives is breathing fresh air. Sleeping with our windows open and playing in the open air every day are very important.

COVERING A SNEEZE PREVENTS THE SPREAD OF COLDS

To avoid Colds, Pneumonia, and Sore Throat. Here are some of the most important things to do in fighting these foes that approach in the fall and stay altogether too long with us:

1. Avoid people who have colds, sore throats, coughs, or pneumonia.

2. Rest and in case you are very ill send for a physician.

3. If you have a cold or a sore throat, notify your teacher when you get to school.

4. When you cough or sneeze, hold something before your face.

5. Wash your hands frequently and carefully. Use warm water and soap.

6. Carry a clean handkerchief.

7. Avoid towels, cups, glasses, knives, forks, spoons, and plates used in common. When dishes are washed they should always be rinsed with clean boiling-hot water.

8. Keep out of hot, poorly ventilated rooms.

9. See that the floors are clean.

10. Avoid rooms in which there is much blackboard dust in the air. Dust of any kind irritates the nose and throat.

11. Do not sneeze or cough if you can avoid it.

12. Keep lead pencils or slate pencils out of your mouth.

13. Have a bowel movement every day.

14. Dress for the weather. Too many clothes are as bad as not enough.

15. Take a cold sponge bath in the morning. Rub the body briskly afterwards with a rough towel until you feel warm.

16. Sleep long hours.

Treatment of a Cold. There should be prompt treatment of a cold as soon as one feels it coming on. The important thing to do is to help the body to overcome the infection. The slight fever which so often marks the beginning of a cold shows that the cells of the body are working hard to destroy the invading bacteria. One of the first things to do, then, is to get as much rest as possible and go to bed early. The body is then free to use all

its energy to recover. One should eat lightly and take a cathartic so that the bowels may move freely. A hot bath before retiring and a hot drink, such as hot lemonade, help to relieve the congestion of blood in the interior of the body. If one feels ill the next morning, it is better to remain in bed.

It would be wise for every child coming down with a cold to stay out of school and rest as much as possible. It would also be kind to one's schoolmates to remain at home, for colds may be easily spread.

Remember

1. Colds are uncomfortable and expensive.
2. Colds are "catching."
3. Much can be done to prevent colds.

What other facts do you remember from reading this chapter?

Health Habits

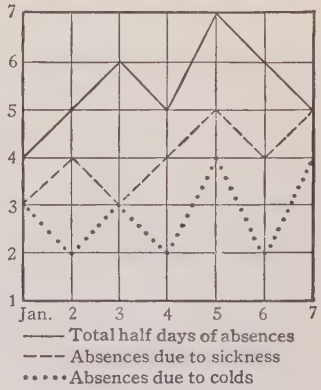
1. Keep away from people who have colds.
2. Keep clean inside and outside.
3. Get the fresh-air habit.
4. Get the cold-bath habit.

Name other health habits helpful in preventing or treating colds.

Things to Do

1. Keep a graph of the absences in your room, like the one on the opposite page, for every month of the year. What does

the record show for each month? What percentage of the absences were due to sickness? What percentage of the absences due to sickness were caused by colds? Make a graph for the year, giving the summary for each month. Make a definite record of the time when schoolroom windows were closed in the fall and opened in the spring. Make a summary of all the things you learned from this year's study. Write up the record for the year in an interesting way and offer it to some local paper for publication.



2. Prepare a five-minute talk for a lower grade on the prevention and treatment of colds.

Review and Thought Questions

1. What causes colds?

2. Why are arctic explorers and hunters who live in tents or rough houses less likely to have colds than those who live in heated houses?

3. Why should we avoid people who have colds?

4. How may colds be prevented?

5. What is the best home treatment for colds?

6. When do colds seem most common?

7. What may we do to protect other people from colds?

8. Why are colds important?

9. What diseases may follow a cold?

10. What percentage of absences due to sickness were caused by colds according to the diagram above? What percentage of the total number of absences were due to colds?

CHAPTER XXV

PROTECTION OF CHILDREN AGAINST ILLNESS

The Conquest of Diphtheria. One of the diseases of childhood that very much resembles a cold, especially at the beginning, is diphtheria. The early signs are those of sore throat with or without grayish-white patches on the mucous membrane of the throat, tonsils, or palate. The illness may be so severe that it becomes difficult for one to take nourishment or to breathe. Until within a short time this has been a great scourge to childhood. Now, because of the many experiments and discoveries that have been made, it seems probable that soon diphtheria will be as rare as smallpox.

The conquest of diphtheria began with the discovery of the bacillus, or tiny rod-shaped organism, which causes the trouble. These bacilli were found in the secretions of the nose and throat. This discovery finally led to the discovery of an antitoxin. It was found that healthy horses inoculated with the toxin, or poison, manufactured by the diphtheria bacillus at length became immune to diphtheria. This fact was due to the increased amount of antitoxin in the horses' blood. They had built up a resistance to the disease. The next step was to secure

some of this antitoxin and inject it into the blood of those who were suffering from the disease. This remarkable discovery has saved the lives of many children and has made diphtheria a much less dangerous disease.

MILK IS A HEALTH BUILDER

"We drink plenty of milk to keep us strong and healthy. We have individual cups." (Courtesy of the Boston Tuberculosis Association)

The Schick Test and Prevention of Diphtheria. The most recent discovery aims to prevent diphtheria entirely. Dr. Schick found that many children were immune to diphtheria: that they would not take it because they had

a sufficient amount of antitoxin in the blood. Through a very simple skin test, now called the Schick test, it was found that some children were susceptible to the disease. After finding out that a child may catch diphtheria, it is a very easy matter to make him immune. This is called immunizing him. The process of immunizing a susceptible person is to inject a small quantity of the immunizing substance into the arm from one to three times.

In this way all the children of the land may be protected against diphtheria.

Protection by Health Habits. Since bacteria are responsible for diphtheria, one way to protect yourself against this disease is to form habits that will make it difficult or impossible for the bacteria to be transferred to you. Health habits that help to prevent diphtheria will help to prevent other illnesses also.

Here is a list of things to remember, to avoid diphtheria:

1. Avoid those who have sore throats.
2. If your throat is sore, report it to your parents and teacher.
3. Do not use towels, cups, glasses, spoons, forks, lead pencils, or slate pencils in common.
4. Do not put pencils and similar articles into your mouth.
5. Keep your hands clean.
6. Do not neglect sore throats.
7. Be immunized if you are not already immune.

Scarlet Fever. Scarlet fever is another communicable disease of childhood. The child ill with scarlet fever has sore throat, fever, headache, and other aches, and in a few days a peculiar rash usually appears on the neck and the

PLAY IN THE OPEN AIR HELPS TO PREVENT DISEASE

upper part of the chest and then spreads to the entire body. Scarlet fever usually shows itself early in fine red spots which tend to run together.

It is maintained that the germ of scarlet fever has been found, and that it is possible to prevent and cure the disease with a serum. A method has been discovered of testing children to find out who are immune. It is well

known that the contagion is in the discharges of the throat, ears, and nose. Scarlet fever may be caught by coming in contact with some person who has it. It is sometimes spread through the milk supply. This can happen only when somebody who handles the milk has the disease. It is spread by coughing and sneezing also.

It is not safe for one to go back to school until at least five weeks have passed from the onset of the sickness, and the throat and ears are normal. The advice of a physician should be followed.

Measles. Measles usually begins, like a cold in the head, with fever, running nose, watery, inflamed eyes, and sneezing. A rash appears on the third or fourth day.

One reason why many children have measles is that the disease begins just like an ordinary cold. Measles is not suspected until the eyes become redder and feel more as if they had sand in them than they do with an ordinary cold. A dry, irritating cough also leads one to suspect a cold. A few days later the eruption appears. It is during this period of fever and aching when the light hurts the eyes and the throat is sore, before any eruption is seen, that the danger of catching measles is greatest.

Measles is spread by the secretions of the mouth and nose. Whenever a person with measles coughs he sends mists full of bacilli into the air for a space of many feet in the direction he coughed and for a few feet in other directions. Therefore a person suspected of having measles

must from the very beginning keep away from children. A child who has been exposed to measles had better stay at home for one week, beginning one week after exposure to the disease. Whenever he coughs, from the time of the first cough, he should hold something in front of his nose and mouth. Sneezing also spreads disease and should be handled in about the same way.

Whooping Cough. Whooping cough begins like any other cough and for a time is usually thought to be a case of ordinary bronchitis, or cold on the chest. Then it is noted that the coughing comes in spells, and that the spells come at night; next, that the child coughs until he becomes nauseated. It may be a week later before the whooping starts.

Whooping cough is hard to control, because the contagion is greatest at the very beginning of the disease, which may be two or three weeks before the whooping begins. Since the disease is spread through the secretions of the throat and bronchial membranes, it is evident that, as in other diseases, children should protect themselves from coughing and sneezing.

German measles and mumps are two other diseases that are spread in the same way.

Prevent and postpone Children's Diseases. There was once a very foolish belief that since every child must have the diseases of childhood sometime, it was a good thing to have them over with as early as possible. There was

also the belief that little children had these diseases more easily than they would in later life. Sometimes children were purposely exposed so that they might catch disease.

We now know that little children do not have the resistance against disease which they have later in life. Whooping cough is a dangerous thing during the first year of life. The danger decreases every year thereafter until adult life is reached. The same things are true of practically all the other diseases of childhood.

In protecting ourselves and others from disease it is always well to remember these things:

1. Contagious disease always starts with somebody who is sick.
2. Avoid people who are sick.
3. Avoid people who cough and sneeze.
4. Avoid the common use of dishes and all things used by other people.
5. Protect other people by keeping away from school if you are ill and by having good health habits.

Remember

1. A cold may be the beginning of a serious illness.
2. Take good care of a cold when it begins.
3. Children's diseases can usually be prevented or postponed.

What other facts can you remember from the reading of this chapter?

Health Habits

1. Avoid people with bad colds.

2. Protect your brothers and sisters by keeping them away from children who are ill.

3. Avoid persons who have a contagious disease or who recently have had one.

4. Do not strain your eyes after being ill.

What other health habits will you add?

Things to Do

1. Write to the secretary of your local or state board of health to find out whether there has been a decline in the number of cases of children's diseases in the last ten years.

2. Get the rules and regulations for the control of contagious diseases from your health department. Read them and report to your class.

3. Have a committee get a copy of each of the warning cards used by the health department. Get a copy also of each booklet on contagion and show them to the class. What are the early signs of each of the diseases of childhood? What are the quarantine rules concerning them?

Review and Thought Questions

1. What illnesses of childhood begin as colds?

2. What are the different reasons why we should avoid those who are coming down with colds?

3. Why is diphtheria decreasing?

4. How are scarlet fever, measles, and whooping cough spread? How may they be prevented?

5. What has been the result of vaccination against smallpox?

6. Why is it desirable to postpone all diseases of childhood?

CHAPTER XXVI

THE WELFARE OF BABIES

Nathan Straus, "The Friend of Babies." Many years ago a boy by the name of Nathan Straus came to America with his parents from Europe. He was poor, but by hard work and perseverance he became a very successful business man. Finally he became a very rich man. He lived in a beautiful house and had every luxury that anyone might wish.

In his days of prosperity Nathan Straus did not forget the poor and the sick. In the city of New York, where he lived, there were many families huddled together in the crowded tenements. Many of the babies were ill because they could not get pure milk or enough of it. At his own expense Mr. Straus set up booths in the public parks where mothers could get pasteurized milk at half price. Milk for sick babies was given to the health department also and to the physicians who attended the babies. Almost at once a change could be noticed. Babies whom everyone expected to die got well.

Mr. Straus was interested not only in providing pure milk for babies, but in establishing playgrounds and in the improvement of the health of children everywhere.

Not only in New York but in other American cities and in foreign countries, such as Great Britain, Germany, and Belgium, Nathan Straus was ready to help with heart and purse. When different nations of the world had a great congress to think of ways of helping the babies, Mr. Taft, then our president, sent Mr. Straus to speak for America.

NATHAN STRAUS
A friend of babies and children

Nathan Straus gained the name of "The Friend of Babies."

Safer Every Year to be a Baby. Twenty-five years ago it was rather dangerous to be a baby. About one baby in four died before having a birthday. The ordinary man or woman at the age of seventy had a better chance to live for a year than a baby. Now in the more healthful communities only one baby in twelve dies. This is because people know so much better than they once did how to take care of babies. Every year it is safer to be a baby.

Good Food for the Baby. The first business of the newborn baby is to grow. To do this he should not do much

for the first few weeks of life but sleep and eat. The feeding should be by schedule. Since the stomach needs rest, the time between the feedings should not be less than three hours. As the baby grows older the time should be increased to four hours. The welfare of the baby is so upset by the fatigue of the mother that he should never be fed more than once a night during the mother's sleeping hours. As soon as possible he must be trained to go without food from the mother's bedtime until her waking time.

The best kind of food for the baby is breast milk. It not only has just the right substances needed for growth but is also fresh and clean. The Board of Health in New York says that among the babies that die, 85 per cent are fed artificially. If breast milk is not available for a baby, some substitute milk may be used, but it must be kept clean, fresh, cold, and free from disease-producing germs. Milk is a perfect food for a young child. After the age of six months other foods should be used in addition to the milk.

If a baby develops indigestion, as shown by diarrhea, he should be made to fast for a few hours or, in some cases, for days.

The food given a baby should contain plenty of lime, because much of his growth in babyhood is growth of bones and teeth, and for these lime is required. Milk, cereals, bread made from whole grains, and most vegetables are rich in just the kind of lime a baby requires for

good teeth. The formation of teeth of good quality is more important to the baby's health than is the cutting of teeth.

Healthy Babies gain in Weight. One of the very best ways of knowing whether a baby is doing well or not is to weigh him regularly. If he loses in weight or does not gain over a period of several weeks, it is a sign that his food does not agree with him or that something else is wrong.

The healthy baby gains in weight rapidly. At the age of five months his weight at birth should be doubled, at the thirteenth month it should be trebled.

A HEALTHY BABY

He is gaining steadily in weight

Protection against Contagion. Most babies are born healthy and they would usually remain so if they had the best of care. It is important to protect babies against illness. Such sickness often weakens the body for life. It is hard to care for sick babies.

Babies find the summer months particularly trying, because they cannot stand the heat well and also because their food is often spoiled. Heat also brings the filthy fly. With the better care of babies the summer has become less dangerous. As the cold weather approaches, trouble from coughs, colds, and pneumonia increases. To check this tendency babies should be kept away from people who have colds. Babies should not be kissed or have their faces, mouths, and noses rubbed against those of others. Floors should be kept very clean, because babies crawl on the floor and also because they often put their hands in their mouths. In careful homes today babies are kept in pens so they will not come in contact with the floor.

Under no condition should a baby ever be exposed to any form of contagion. Even if a child must have measles, it is much better for him to have the disease when he is five years old rather than when he is five months old. Diseases of childhood should be postponed as long as possible. It is, of course, even better if they can be entirely prevented.

Fresh Air and Sunshine. Babies should sleep in well-ventilated rooms. The temperature should not be too hot. They should get the fresh air whenever the weather is fit, but too much exposure in order to toughen a baby will do more harm than good. Usually babies are clothed too warmly. This makes them feel very uncomfortable and fussy. It also makes them more susceptible to colds.

It is now known that babies need sunshine to be healthy in the same way that plants need it to grow. Bright sunshine should never be allowed to shine into the baby's eyes, because it is likely to injure them.

Babies need Training. Mother Nature sees to it that a baby learns and develops. Babies usually sit up at the

FRESH AIR AND SUNSHINE MAKE BABIES GROW

age of seven or eight months, crawl at nine or ten months, and walk at twelve to sixteen months. They can usually say "mamma" when they are a year old. At the age of five to nine months they ordinarily cut their first teeth.

Although a baby can do so many things without being taught, he needs to be trained. It is during babyhood that children sometimes hold their breath, have tantrums, and show violent emotions. These may be very harmful in

the later life of the grown-up man or woman. Such outbreaks by a baby should never be encouraged. If every time a baby cries violently he is picked up, he will soon form the habit of getting his own way by crying. Often

TRAINED HELPERS

These girls are receiving diplomas for their work in mothercraft. They have learned how to take care of babies. (Courtesy of the Boston Tuberculosis Association)

babies have tantrums to get their own way. If nobody pays any attention to them the habit will soon be broken. When such bad habits are allowed to develop in childhood and infancy, a child may grow up to be nervous.

No baby or little child should ever be badly frightened.

Shocks due to fright are often responsible for night terrors. Many people suffer throughout their lives because of some intense fear which they experienced in early childhood.

Every child to be healthy must be trained in good habits of sleeping and eating.

Remember

1. Every day the world is becoming a safer place for babies.
2. Nathan Straus was a friend to babies.
3. Babies need good food to be healthy.
4. All babies need careful training.

What other facts do you remember from the reading of this chapter?

Health Habits

1. Never kiss babies on the mouth.
2. See that the baby has regular hours for feeding.
3. See that the baby has regular hours for sleep.
4. See that the baby has fresh air every day.

Name other health habits that babies ought to form.

Things to Do

1. Offer to take care of your own baby brother or sister or some other baby in your neighborhood.

2. Write to your city or state department of health for some printed matter on the care of babies. Report what you learn to the class.

3. Make a study of the habits of a baby. Keep a written record. Does he go to sleep at the same time every day? Does

he take his nourishment regularly? What good habits or bad habits is he forming?

4. Tell the story of Nathan Straus. Find out more facts about his life.

Review and Thought Questions

1. Why do you think Nathan Straus was a good citizen? What was his greatest work?

2. Why is the world a safer place for babies than it once was?

3. Why is breast milk better for babies than cow's milk?

4. Is there a kind of cow's milk sold in your community especially for babies? What is it called, and how does it differ from the ordinary milk sold to families?

5. What can you tell about good food for babies?

6. How may babies be given fresh air?

7. What are some of the most important signs of health in babies?

8. Why do babies need to be trained?

9. What is the danger in disciplining young children by telling them stories about the "bogy man"?

10. What are some other wrong methods of training babies and young children?

11. Discuss the best methods of training babies.

CHAPTER XXVII

HEALTH AND THE SCHOOL

The School Building. On school days children spend nearly half their waking hours in the school. It is therefore very important that the school should be a healthful place for boys and girls if they are to develop into strong and healthy children.

The schoolroom and building should have all the advantages of the best kind of home. There should be plenty of window space to give the rooms light and sunshine. Each window should have window shades. There should be excellent ventilation, a temperature of about 68 degrees, comfortable and hygienic school furniture, drinking-fountains, a place to wash the hands and face, clean towels, and freedom from excessive outside noise. Our best schools today have large playgrounds.

Prevention of Contagion. The school may be a means of spreading disease in a community unless great care is taken. If a contagious disease breaks out in school, it may spread not only in the school but in the homes of the neighborhood. Epidemics are not spread in this way as much as they once were, because people know so much more now about the prevention of disease. In our best

cities the health of children is being furthered by these things:

1. Building sanitary schoolhouses.
2. Giving children attractive playgrounds.
3. Training children in good health habits.

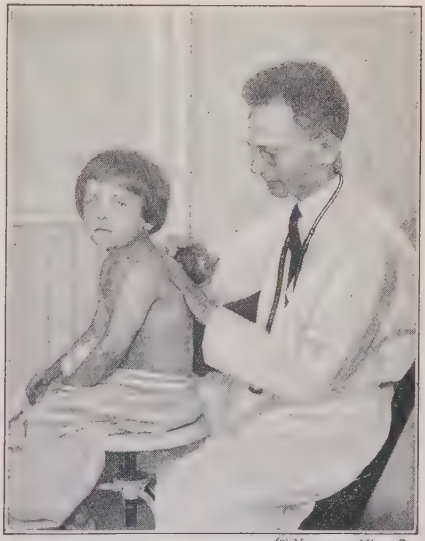
A MODERN SCHOOL BUILDING

4. Providing teachers, school doctors, and school nurses who early notice symptoms of illness and send pupils home and do not allow them to return until they are well. In this way contagion is prevented.

The School Doctor. The only work of the school doctor when he was first employed by school systems was to

prevent contagion. This is still a very important part of his work, but he is now doing a good deal in building up the health of the pupils.

In many schools there is a physical examination of every pupil each year, and as many other examinations as are necessary. Usually the school nurse assists in this, and sometimes both teacher and parent are present. Every machine needs to be examined from time to time to see whether any of the parts are in need of repairs. This is true of the human machine also. The doctor advises the child and others who have contact with him in home and school. Sometimes he advises going to the dentist. This examination often leads to the correction of habits regarding food, to getting more sleep, or to forming other health habits to keep the body fit. There are many children who are not ill, but who could profit from the advice of the school physician.



© Keystone View Co.

THE SCHOOL DOCTOR HELPS CHILDREN TO BE HEALTHY

In addition to the yearly examination, the doctor examines from day to day the children who may be referred to him because they appear ill or because the teacher calls upon him for advice.

The School Nurse. In many schools today there is a school nurse who assists the school doctor and the teacher in making examinations. Often she gives treatments for the itch, ringworm, lice, and other minor defects. One of her most important duties is to carry the advice of the school physician to the home and help the parents. This often means advising parents about the care of the teeth, the removal of adenoids, or the proper food for children. Incidentally, and often directly, the school nurse gives the pupils lessons on health.

School Housekeeping by Pupils. Every pupil may do much to make the school a healthful and attractive place in which to live. The janitor may do his very best to keep the buildings and grounds of the school in good condition, but he needs the help of every child. If children are careless, the school cannot be as healthful and attractive as it should be. Good housekeeping is needed in the school as well as in the home.

Here are a few things the boys and girls of any school may do to help:

1. Empty wastebaskets frequently.

2. Line wastebaskets to keep small bits of waste from the floor.

3. Put all waste paper into the wastebasket.
4. Dust school furniture with a damp or oiled rag.
5. Keep wash bowls or basins clean.
6. Clean erasers out of doors.
7. See that no crumbs are left around after lunches.
8. See that school property is not marred or defaced.

Add to this list other things that you can do to make your school building and grounds neater and more sanitary.

America's Fine School Buildings. It is said by those who have traveled abroad that although Europe may excel us in many things, we have remarkable school buildings and equipment. Some of our school buildings are so magnificent that they are superior in comfort and often in beauty to the palaces of kings a few centuries ago. This is true only of our best school buildings and in those communities that have public-spirited citizens.

However, a good schoolhouse is not necessarily healthful. No matter how fine a school building may be, it still needs the kindly and intelligent care of boys and girls trained in good health habits and ideals of citizenship.

Remember

1. A healthful school helps to make healthy children.
2. School children can help to make their school healthier.

What other facts do you remember from the reading of this chapter?

Health Habits

1. Do your part to make the schoolroom, building, and grounds cleaner and more attractive.

2. Play fair on the playground.

3. Adjust the window shades so that you do not face the light.

Name other health habits that should be practiced in school.

Things to Do

1. Have a committee make a health survey of the physical condition of your schoolroom, school building, and grounds. Are there enough wash bowls, soap, and towels? What do you need most? Suggest some things that the pupils of the school might do to better conditions.

2. Get up an entertainment to buy something for the school; for example, a sanitary drinking-fountain, or something else that is needed for the health of the school.

3. Elect a committee on ventilation to see that the temperature of the schoolroom is kept about 68 degrees.

4. Organize a health club. Elect a president, secretary, and treasurer. What problems will you discuss?

5. Get out a paper called *The Health News*. Elect an editor and reporters. Publish in your paper all the health news of your room and school; also insert other health news about the community.

6. Write health slogans.

Review and Thought Questions

1. Why is the condition of the school building important for health?

2. How would you describe a sanitary school building?

3. How may the school help to spread disease?

4. What may the school do to prevent the spread of disease?

5. What is your school doing to prevent epidemics?

6. What is the work of the school doctor?

7. How may a school nurse help to keep the school healthful?

8. What is your room doing in the way of school housekeeping?

9. Why is a wet cloth better for dusting than a feather duster or a dry cloth?

10. What is the most important thought in the last paragraph of this chapter?

CHAPTER XXVIII

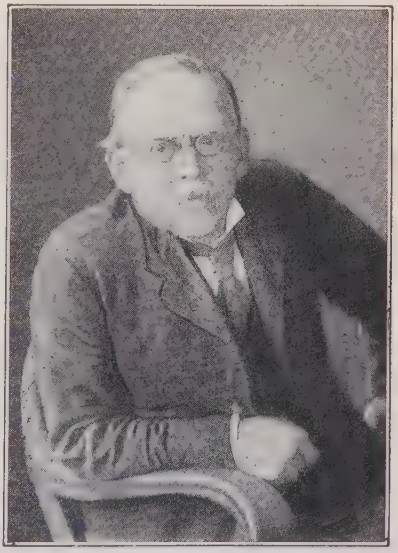
GOOD HOUSING

Jacob Riis, a Good Fighter. In one of the quaint towns of southern Denmark Jacob Riis was born in 1849. In that town the streets were narrow and paved with cobblestones. The houses were roofed with red tiles, and occasionally among the chimney tops could be seen the figures of long-legged storks. Jacob's father was the headmaster of a Latin school and hoped his son would be a scholar; but Jacob did not take kindly to school, and when he became twenty-one years of age, he resolved to seek his fortune in America.

After a long, rough voyage he landed in New York in 1870. The years that followed were very trying. Jacob was a stranger in a strange land. He had so many hardships himself and saw so many poor people that he sympathized deeply with everybody in distress.

Finally he became a reporter on one of the leading New York newspapers, and regularly visited police headquarters. He soon began to learn about the great tenement district, with its dirty, crooked streets. In these tenements two million persons were huddled together in dark, filthy rooms. Sometimes he found ten, twenty, or

more persons sleeping in a single room. One day when he was in a tenement he asked a little girl whether the sun ever shone in their window. Her face lighted up as she told him that it did just once for a short time in the summer. The heart of Jacob Riis was touched. He believed that if the people of New York knew the facts they would not allow little children to get sick and die because of the houses they had to live in. He told the stories of the tenements in the newspapers and in his books. One of these books was called "How the Other Half Lives." It made a big stir. Theodore Roosevelt, after reading it, hurried over with great eagerness to the newspaper office where Mr. Riis worked. Not finding him in, he left a note saying, "I have come to help."



JACOB RIIS

An adopted citizen who worked to make America a cleaner and better place in which to live

Roosevelt and other brave men and women did help. Soon better laws were passed so that sleeping-rooms could not be built or used unless they had windows. The old

tenements were torn down, the streets were cleaned, schools were built, and playgrounds and parks were provided. In other cities in this country needed improvements were made in housing, and good laws were passed.

JANE ADDAMS

A great American citizen and friend of childhood

Jacob Riis will long be remembered in America as a sincere friend of children and of all who were unfortunate.

Jane Addams, a Devoted Citizen. Another famous citizen is Jane Addams, who took a keen human interest in the people living in the crowded tenements and poorer sections of Chicago. She founded Hull House, where

young and old might come to play and learn how to live better. Hull House became so famous that many people have crossed the ocean to see it.

Good Housing and Health. One day a member of the health department of a certain city began to put a pin in a large map of the city to indicate every place where there was a case of tuberculosis or other contagious disease. Into a similar map were put pins wherever there was known to be foul plumbing, filthy yard closets, damp, sunless chambers, overcrowding, and dirty yards. It was then found that the two sets of pins came in about the same places. Any good health department could prove the same thing. Good housing pays by making healthy citizens.

It must not be imagined, however, that all the bad housing is found in the city. It is worse there because of the overcrowding; but often houses in the country are so improperly built as to furnish insufficient light and air.

Good Housing Requirements. By good housing is meant houses in which people can live under conditions that make for health and where children can grow up to be strong and well. Here are a few of the most important requirements:

1. *Space.* The house should not cover all the ground on the lot. Some room should be left for a grass plot or a vegetable garden and a tree or two. It is best that some vegetation should grow where many people are to live.

2. *Site.* There should be protection from dampness. The house should be built on high rather than low ground. Moisture should be prevented from seeping up the walls from the ground below or down the walls from the gutters

IN THESE TENEMENTS MANY PEOPLE ARE HUDDLED TOGETHER IN A SINGLE ROOM

of the roof. Draining the ground around the house and providing a dry cellar and proper gutters and roof drainage will keep the walls dry.

3. *Sunlight.* The space around the house should be exposed to sunlight at some time during the day. Sunshine is needed to purify the air, the dust, and the surface of the ground. It is very effective in destroying those bacteria

that cause disease. The house must be so placed and arranged that sunlight can get into the rooms. It is needed there to sterilize the bedding, the carpets, and the dust on the walls and floors. Frequently the laws require

MODERN SANITARY TENEMENTS

that some space be left around each house and that air shafts and light shafts and court be so arranged and so large that no room shall be used as a bedroom unless it is lighted by daylight during the day.

4. *Heating and ventilating.* For comfort and health a house should not be too hot in summer or too cold in winter. Probably more harm comes from overheating houses than from not heating them enough. Overheating

is one cause of colds. Windows should be used freely for ventilation, especially in sleeping-rooms at night.

5. *Piazzas and sleeping-porches.* One of the reasons why people are healthier now than their parents were is that many of them spend much of their leisure time on piazzas. Sleeping-porches also have become more popular.

6. *Sewage.* The disposal of body and household wastes is one of the most serious of health problems. Unless these wastes are properly disposed of they become a menace to the health of a community. In cities these wastes are easily and properly disposed of through sewer pipes. In villages and rural districts, where outhouses and cesspools are used, the problem is more serious. An outhouse should be at least a hundred feet from the well and on land that slopes from the well. The same care should be taken in regard to cesspools.

Remember

1. Jacob Riis was an ideal American citizen.
2. The citizens of a city are responsible for bad living conditions in their city.
3. Every house should have plenty of sunlight.

What other things do you remember from the reading of this chapter?

Health Habits

1. Take an interest in good housing in your community.
2. Try to make your own house a model.

Things to Do

1. Tell the story of Jacob Riis.

2. Find out more facts about the life of Jacob Riis.

3. Read some of his books. Inquire for them at your library.

4. Find out something about the life of Jane Addams and her work for good citizenship in Chicago.

5. Find out whether there are any building regulations in your city or town. What are they?

6. Have a committee make a report on the housing in a block in your neighborhood.

7. Try to find out from your health department whether there is any relation between housing and health in your community.

Review and Thought Questions

1. What is a good citizen? What did Jacob Riis do especially that made him a good citizen?

2. Do you have slums in your city? Why do they exist? What have some cities done to get rid of them?

3. How does the housing of a community affect its health?

4. Is there any bad housing in the country? Explain.

5. Why is the site of a house important? Explain.

6. Why should there be space around a house?

7. Why should the inside of a house be exposed to sunlight?

8. How do piazzas and porches affect health?

CHAPTER XXIX

HEALTH IN THE HOME

Importance of the Home. Since we spend more hours in the home than in any other place, it is very important that it should be healthful. There are two things that are important for a healthful home. First of all, good health in the home depends on the kind of building that the home is in. In the previous chapter we learned that a house should be built on high ground, if possible have space around it, be well lighted and heated, and have good sewerage. A second thing that is equally important is the health habits of the people who live there. People whose homes are in rather undesirable buildings may be healthy if they live in the right way. Health habits help to make the home safe, healthful, and sweet.

Methods of Cleaning. Dust and dirt not only make a house unsightly but are often the means of carrying disease. Filth may be tracked into a house by the feet and deposited on floors, rugs, and carpets. Through carelessness it then may be transferred to the mouth and cause illness. Especial care should be taken to keep floors clean when there are little children who play on them. It is quite the fashion today to have in the house as little as

possible that will catch and hold dust. Carpets and heavy draperies are not used now as much as formerly. However, the use of the vacuum cleaner makes carpets much more sanitary and freer from dust than they used to be.

A CLEAN AND ATTRACTIVE KITCHEN

Feather dusters and dry dust cloths, since they keep the dust in the air, are not conducive to either cleanliness or health. Dustless dust cloths sold in stores are excellent but expensive. A dustless cloth may be made easily by moistening an old cloth with a little water or kerosene. The vacuum cleaner is one of the best devices for the removal of dust.

Flies, fleas, bedbugs, and cockroaches, because of their contact with filth and the possibility of their carrying disease, should be kept out of the house.

Care of the Bathroom. Unless a bathroom is kept very clean, it is likely to be a means of transferring disease. This is especially true of everything that people are in the habit of using in common. Sore throat, colds, grip, and other communicable diseases easily may be transferred by unclean doorknobs, faucet handles, toilet flush handles, and other bathroom fixtures.

It is necessary that members of a family should use individual towels, wash cloths, handkerchiefs, and toothbrushes. Everybody who has a cold or sore throat should use the bathroom in such a way as not to infect other members of the family. Washbowls should be flushed with hot water. A piece of clean paper may be used to turn on the faucets. Bathtubs should be thoroughly washed with hot soapy water and rinsed with clean hot water before a bath is taken. This should be observed especially when one is in a hotel. Bathrooms should be thoroughly ventilated every day, but should be comfortable enough so that a morning shower or sponge bath may be inviting.

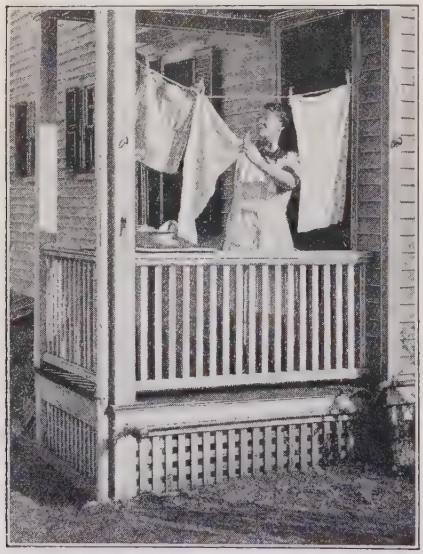
Washing Dishes. The proper washing and wiping of dishes is one of the most important health habits of the home. This is a task which is often badly done. Dirty, soapless dishwater is too common. Dishes need to be

scraped carefully before washing if the water is to be kept fairly clean. If the dishwater is to remove the grease and food from the dishes, it should be soaped until it lathers. Since glasses and forks come in contact with the mouth, special care should be taken to wash them in very soapy water and thoroughly rinse them in hot water. Boiling water is really the only safe water to use, because it sterilizes the dishes. The dishwater should be changed very often, especially if the dishes are quite greasy. Dishes should always be exposed to sunlight if boiling water is not available.

RINSING DISHES WITH BOILING WATER IS NECESSARY FOR HEALTHY LIVING

Care of Dishcloths and Towels. To keep the dishcloths and towels clean and sweet-smelling they should be washed often. Dishcloths, especially, should be washed and rinsed each time after using and hung where they will dry. The towels and cloths should be spread out if possible where the sun will shine on them.

Disinfectants. Disinfectants bought at the drug store are commonly used for cleaning the sink and toilet. Many of these are deodorizers which may hide a sour or musty smell without cleansing thoroughly. If the plumbing is in good condition, all that is necessary for disinfecting is soap, good clean water, air, and sunshine. If these are not effective the plumber should be sent for.



SUNLIGHT IS A DISINFECTANT

Good Habits in the Home. Although there is less danger of transferring disease through bad health habits in the home than in some public place like a hotel, there is always some danger. A person coming down with a bad cold or some other contagious disease may transfer it to somebody else through careless habits. Among these bad habits are licking the fingers, using the dish towel as a hand towel, dipping the tasting-spoon back into the food, handling the handkerchief, and putting food back on the serving-plate after tasting. Some of these bad habits of people

who handle food are especially dangerous. Nobody should handle food without having clean hands.

Those who need to employ help in their kitchens should be especially careful to employ only those who are in good health and are scrupulously clean and hygienic in their habits.

Some cities that are active in protecting the health of their citizens require every person handling food in a public eating-house first to pass a physical examination. This regulation has become operative in New York City recently.

Remember

1. Healthy living helps to make the home happier.
2. Health habits count in making a home healthful.
3. Every child can do something to make home a happier and more healthful place in which to live.

What other things do you remember from the reading of this chapter?

Health Habits

1. Lend a hand to keep the house clean.
2. Remove rubbers on entering the house.
3. Hang clothes in their proper places.
4. Make your own bed.
5. Use a dustless cloth. Away with the feather duster!
6. Rinse dishes with boiling-hot water.

Make a list of other health habits for the home.

Things to Do

1. Make a list of good home habits. Mark yourself on each habit: *E* for "excellent," *G* for "good," *F* for "fair," *P* for "poor," and *Fa* for "failure."

2. Mark yourself each month on these habits. Make a graph to show your improvement.

3. Organize a householders' club. This is a club for boys. It will look after the safe disposal of ashes and garbage in the home and keep the lawn in good condition. What other things may a householders' club do?

Review and Thought Questions

1. What two things are quite essential for a healthful home?

2. How does cleanliness affect health?

3. What is the best way to furnish a house so that dirt will not collect easily?

4. Does it cost money to be clean? Explain.

5. What rules should govern those who handle food?

6. What are the possible dangers from a bathroom that is not kept clean? How may they be avoided?

7. Is dishwashing important for health? How should it be carried on?

8. What is a disinfectant? What are the best kinds to use?

9. What health habits should children learn at home?

CHAPTER XXX

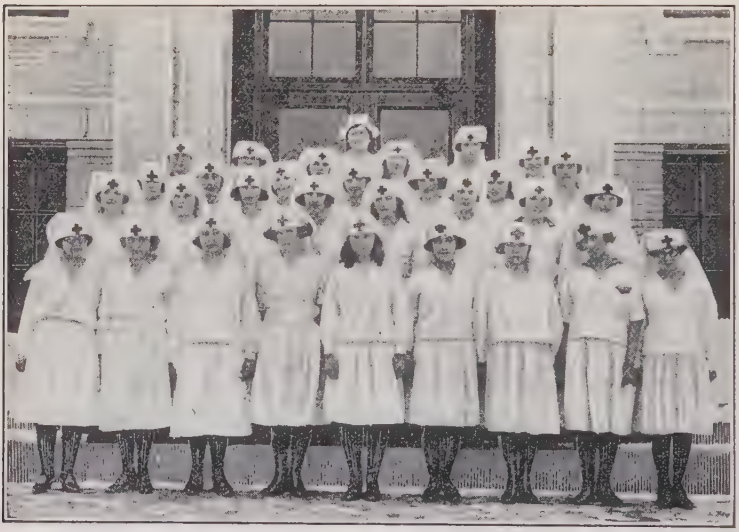
HOME CARE OF THE SICK

When Ill stay in Bed. When we feel ill one of the best things to do is to go to bed and call in a physician. There is an old saying that "a stitch in time saves nine." If the doctor comes early he may often prevent a more serious illness. Some people have a foolish idea that when they begin to feel sick they should stay on their feet and do their regular work as long as they can. It is a good idea not to pay too much attention to every little ache and pain; but whenever we do not feel as well as usual, it is desirable that we get as much rest and sleep as possible. If the cells of the body are all in action they have less chance to defend the body against disease. In serious illness going to bed gives the cells of the body a good chance to fight. When a person gets weaker while staying in bed on account of illness, it is the disease and not staying in bed which causes the weakness. Going to bed early is one of the best ways to build up the body and prevent illness.

While there are some cases of sickness which can be taken care of better by nurses, the great bulk of the nursing must always be done by members of the family;

therefore every boy and girl should learn something about the care of the sick in the home.

Care of the Bed. Every boy and girl should know how to make a bed so that it is comfortable. The sheets and



TRAINED FOR SERVICE

These girls are graduating from a Red Cross class in home nursing. (Courtesy of the American Red Cross)

pillowcases should be kept clean and free from wrinkles. When a patient is seriously ill, the sheets should be changed in a way that will disturb him as little as possible. A good plan is to make up one side of the bed with the sheet folded in the center. Then the patient may be rolled over gently and the sheet be straightened out.

Keeping a Record. The good home nurse needs to know how to carry out the doctor's directions. One thing the physician always wants to know is how the patient has been since his last call. This often requires the keeping of some sort of record of temperature, pulse beat, etc.

The temperature is taken by placing the bulb of the clinical thermometer under the tongue and causing the lips to be closed and held together for five minutes. The thermometer is then read, and the reading set down on a record which shows the day and hour.

The pulse beat is counted for one minute. The finger is held on the pulse at the wrist. The pulse rate is set down in the same way.

The record should also show the appearance of the tongue.

One who is giving home care should know how to give a sponge bath to a sick person.

Preventing the Spread of Disease. In contagious diseases every sick person is a source of danger to other members of the family and the community unless he is properly cared for. The person giving home nursing in cases of contagious disease must use great care to see that the illness is not spread.

One way in which disease may be spread is through the bowel excretions. These should be removed promptly from the room and destroyed or disinfected so that they cannot pollute the water supply or be reached by flies.

All persons who have no duties to perform in the sick-room must be kept out.

It is a good rule to keep all animals out of the sickroom. If the disease is one that is insect-borne, an effort must be made to keep insects, such as mosquitoes, flies, fleas, and bedbugs, from reaching the patient or his excreta. Sometimes this is more important than keeping people away. One of the things we have learned about yellow fever is that people can come into the sick chamber with safety but that mosquitoes must never be allowed in the room. The same is true of malaria. The mosquito that bites a patient who has malaria or yellow fever may, by biting a healthy person, spread the disease.

In case the disease is one that is spread by the sputum and the secretions of the mouth and nose, these secretions should be caught in handkerchiefs, cloths, paper, or in special cups, which must be protected properly, especially against flies. As soon as possible they must be sterilized either by heat or by chemicals. Sputum cups may be emptied in the toilet, but the cup itself must be sterilized afterwards. When paper and old cloths are used, they should be burned. Handkerchiefs and towels should be boiled.

Not only in tuberculosis, pneumonia, and diphtheria may the mouth secretions be dangerous: it is through them that scarlet fever, whooping cough, measles, and many other diseases are spread.

It is very important that the nurse wash her hands frequently and well with plenty of hot water and soap. The hands and face of the sick person should be kept clean and the hands should be washed before each meal.

A LIGHT, CHEERFUL ROOM HELPS THE PATIENT TO GET WELL

The dishes, particularly the cups, spoons, and forks, should be sterilized by boiling-hot water. Since we do not put knives into our mouths nor put saucers or plates to our mouths, it is not quite so necessary that they be sterilized. For safety it is a good plan to keep the patient's dishes separate from the other dishes of the household.

Be Cheerful in the Sickroom. Everything possible should be done to keep a sick person in good spirits. This is quite as essential for recovery as good ventilation and nourishing food. In caring for the sick, try to look on the bright side of life. If the patient is not too ill, reading beautiful stories, telling humorous anecdotes, or rendering soothing music all help him to recover. Keeping the sickroom clean, quiet, and well ventilated aids in keeping the patient in a good frame of mind, since it adds to his comfort.

Remember

1. Most illness can be prevented.
2. Good home care of the sick will usually shorten an illness.

What other things do you remember from the reading of this chapter?

Health Habits for the Home Nurse

1. Keep your hands very clean.
2. Keep smiling. Keep your patient smiling.
3. Keep the room clean and comfortable.
4. Keep insects, dogs, and unnecessary visitors out of the sickroom.
5. Keep the patient comfortable.
6. Be orderly.
7. Keep a record.
8. Learn your task. Do what you undertake properly. Do not undertake what you do not know how to do.

What other habits should home nurses have?

Things to Do

1. Demonstrate how to make a bed. Make a bed with a make-believe patient in it, or use a big doll for a patient.

2. Invite a Red Cross nurse or some other nurse to give you a talk on home nursing.

3. Consult "Home Hygiene and Care of the Sick," published by the American Red Cross, for further information. Report to the class.

4. Find out all you can about the work of the Junior Red Cross.

5. Visit a hospital to find out more about the care of the sick. Report to the class.

6. Do something to make some sick children in a hospital happy. Talk about all the things you might do.

7. Organize a Little Mothers' Club.

Review and Thought Questions

1. Why is it desirable to stay in bed when ill?

2. Why is skill in home nursing desirable?

3. Why should a record be kept for the doctor? What should go into a record?

4. How can the home nurse prevent the spread of disease?

5. What can be done to keep a patient cheerful?

6. Why should a nurse be cheerful and keep her patient hopeful?

CHAPTER XXXI

PURE WATER

Water a Necessity. There is an old saying that "we never miss the water till the well runs dry." This is another way of saying that it is only when we need water that we realize how necessary it is. If after many weeks there is no rain, the crops in the fields begin to dry up, and there is trouble in watering the stock. There may be difficulty even in getting water for the use of the household, because wells and city reservoirs are low. It is then that we begin to think how very necessary water is.

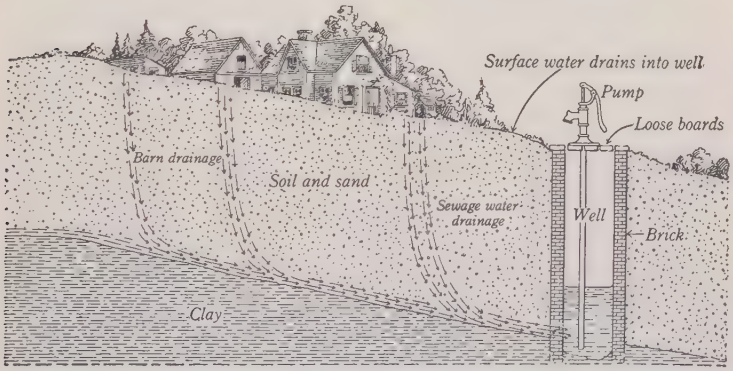
About 70 per cent of the body is water. Most of the food we eat is composed largely of water. Water is a necessity for everything that lives.

Nobody can be healthy without drinking plenty of water. Water improves the digestion, gives the stomach and intestines a much-needed washing out, and keeps the tissues in a good condition.

Every child who wishes to be healthy will drink from four to six glasses of water a day. Water should not be taken when food is in the mouth because it may lead to washing down food before it is mixed with saliva.

Water easily Polluted. The water we drink should be pure. Unfortunately water which is polluted with disease bacteria may be clear and cold and free from odor or taste that would warn one of danger.

Water is easily polluted by the bodily wastes of human beings. If all sewage could be kept entirely away from



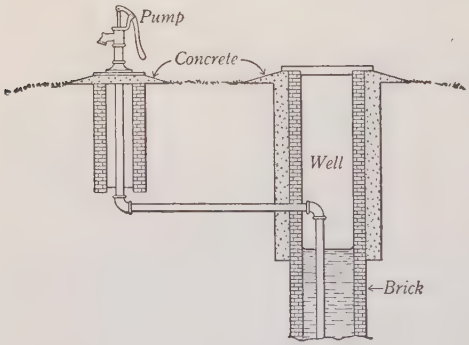
HOW WELLS ARE OFTEN POLLUTED

drinking-water, there would be almost no difficulty about having water free from bacteria that produce disease.

Cholera, dysentery, and typhoid fever are among the so-called water-borne diseases. Before there was any special care to provide pure water and milk, typhoid fever was a very common sickness in both city and country. Today, in those communities that look after matters of health, it has almost disappeared.

Typhoid fever has always been one of the dangers to

be feared in army life as much as the bullets of the enemy. During our war with Spain in 1898, in some of our camps one man in five had typhoid. During the World War, in camps in the same region there was less than one case for every three thousand men in two years of service. Care of the water and milk supply and inoculation against the disease were the chief causes of the decrease in typhoid fever.



A SAFE WELL

Can you tell why?

To get Pure Water in the Country. Getting pure water in the country depends on keeping polluted material out of the well. The good well must be a deep well. We very rarely find wells less than thirty feet deep that are safe. Water which comes from a deep well is more likely to be pure, because in its seepage through the many feet of soil bacteria are filtered out.

But a well may be deep and be polluted by surface water that flows into the top of the well. One way to prevent this is to cement the top of the well. It should be cemented above the ground, and the cement should run down through the seepy subsoil.

The location of a well is one of the common causes of pollution. It should be on the highest ground around the house and not within one hundred feet of outhouse, stable, pigpen, cesspool, or any place where slops may be thrown

PURIFYING THE WATER SUPPLY

The water used by Cambridge, Massachusetts, passes through these sand filter beds

on the ground. In no case should the well be placed between an outhouse and a river or lake toward which the soil moisture is steadily flowing.

The poets have sung about the delights of drinking from the crystal waters of babbling brooks and springs. Brooks and springs often do look very alluring, but it

should be remembered that water is not good to drink simply because it is cold and looks clear. Far away, on higher ground, there may be a farmhouse or a camp that drains into the spring or brook. The beautiful-looking water may be as dangerous as a bottle of poison.

Making Impure Water Safe. When one is uncertain about the purity of water, one of the safest and easiest things to do ordinarily is to boil the water. Tablets of hypochlorite of lime, or of chlorozone, are sold in most drug stores. If one of these be dissolved in a gallon of water, and the water be allowed to stand for about half an hour, it will be safe to drink. Another good method is to put one drop of iodine into a quart jar filled with water and shake thoroughly. In twenty or thirty minutes the water will be ready to drink.

Any person may readily find out about the purity of a public water supply by sending a small quantity to the state health department for examination.

Making Water Safe for Cities. One of the most serious problems of cities is to get a sufficient supply of pure water. In some cities as much as three hundred gallons a day is used for every citizen.

Since wells and other private means of getting water have been largely done away with, and nearly every person gets his water from the same source, it is easy to see how impure water might cause sickness in an entire community. This is shown in the history of Philadelphia and

Camden, on opposite sides of the Delaware River. In 1905 Philadelphia, with a population of 1,417,002, had 724 deaths from typhoid. Camden, at the same time, with a population of 87,000, had but 15 deaths from typhoid. Philadelphia had a population sixteen times as large as Camden, but the number of deaths from typhoid was nearly fifty times that in Camden. The reason was that Philadelphia took its water from the Schuylkill River, which was contaminated. Camden got its supply from deep wells. As soon as Philadelphia improved the water supply, there was an immediate and striking decline in the typhoid death rate.

The means for providing good water in our large cities have so improved that now typhoid has almost disappeared. It is more common in the country.

To get a supply of water for a city the wells are sometimes driven to great depth. Often great reservoirs are made by buying the land in a valley and using it as a place to hold water. This often means the destruction of acres of farm land and villages. One of the great engineering tasks is to pipe this water from an artificial reservoir or from a lake to the city. This often requires tunneling through hills and mountains for many miles.

Such a water supply is constantly inspected to see that it is pure. To be certain that water is safe, it is usually filtered. Frequently this is accomplished by forcing it through a bed of clean sand that strains out the bac-

teria. Another method is to put into the water some kind of chemical which kills the harmful bacteria, such as chlorine. Cities today carefully guard their water supply.

Safety of Ice. Freezing kills a moderate part of the bacteria in water. As time passes, the bacteria frozen in the ice die. Ice even from polluted water is safe after it has stood for five months. From 50 to 90 per cent of the bacteria are killed after the ice has been stored for one week.

Even pure ice may be contaminated before it gets into the mouth. It may come in contact with dirty sidewalks or the soiled hands of drivers, porters, and waiters. All ice should be washed carefully before being used in drinks.

Remember

1. Pure water is a necessity.
2. Many children drink too little water for healthy living.
3. Clear water may be dangerous.

What other things do you remember from the reading of this chapter?

Health Habits

1. Drink plenty of water every day.
2. Never drink water from a ditch or stream.
3. Sterilize your drinking-water if you suspect that it may be tainted.
4. Use a private drinking-cup at school and at home.

Name other health habits.

Things to Do

1. Make a study of your water supply. Find out something about the source of the supply, how it is purified, and how it is delivered to the citizens.

2. Demonstrate the sterilization of a quart of water by using iodine according to the directions in the text; also sterilize with hypochlorite tablets.

3. Make a survey of a dozen wells in your community. In how many cases should you have doubt about the purity of the supply for drinking? Why?

Review and Thought Questions

1. Why is water a necessity for human beings?

2. How may water in a well in the country be polluted?

3. How may a city water supply be polluted? What is the danger from the pollution of the water supply?

4. How is city water made safe?

5. Is it safe to drink from a brook? Give reasons for your answer.

6. Where should wells be located?

7. How may water be sterilized?

8. Is it safe to use ice in one's water or food?

9. In what ways may pure ice and water be contaminated before they reach the consumer?

10. Under what circumstances would knowing how to make a paper drinking-cup be desirable?

11. Why is it that no city with a poor water supply has ever grown great and prosperous?

CHAPTER XXXII

PURE MILK

Milk as a Food. Human milk is a perfect food for babies. It is fresh, free from bacteria and dirt, and very nourishing. It also contains substances which are a protection against such diseases as measles.

Cow's milk is an excellent food for older children. It is good fuel, because it contains fat and sugar. They need it to keep them warm and to provide energy for work and play. Milk contains water, protein, minerals, and vitamins. To be healthy, children should drink about a quart of milk a day. Children need also vegetables, fruits, cereals, eggs, and some meat.

Milk easily Contaminated. Like water, milk is easily contaminated and may spread disease. It is better than water for bacteria to thrive in, because it is a food. Many of the bacteria found in milk are not injurious, but milk may be the means of carrying typhoid fever, tuberculosis, diphtheria, and other diseases. The health of any community depends to a very large degree on the purity of its milk supply.

Healthy Cows. The first requirement for pure milk is healthy cows. They should be fed good food, be provided

A PRIZE POSTER

Miss Ruth Kulish of Cleveland, Ohio, was awarded the first prize in a national health-poster contest conducted by the *Hygeia Magazine*. Out of four thousand four hundred and ninety-two posters submitted, this one by Miss Kulish won the prize

with plenty of pure water, and have a stable where there is good light and ventilation. The sick cow is a menace to any milk supply. Our very best milk farms provide a regular inspection by a veterinarian, and those cows that show the least sign of sickness are no longer used for dairy

TESTS SHOW THAT THESE COWS ARE HEALTHY

purposes. The tuberculous cow may transmit the disease through milk or butter. This is known as bovine, or cow, tuberculosis. When it appears in human beings it is usually known as bone, or gland, tuberculosis. It is possible, through what is known as the tuberculin test, to find out whether cows are infected with tuberculosis.

Milkers should be Clean and Healthy. It is about as necessary for the milkers to be clean and healthy as it is for the cows. In the best dairies not only are the stables clean and airy, but the milkers are dressed in clean white suits. They are careful to wash their hands thoroughly

A MODEL COW STABLE FOR THE PRODUCTION OF PURE MILK

each time before milking. Pails, pans, and cans also are cleaned regularly with hot water. None of the utensils should be exposed to flies. A clean milk pail may be contaminated by a dirty fly walking inside it.

Contaminated milk is so often the cause of an epidemic of sickness that it is customary now for boards of health to investigate the milk supply as soon as there is an out-

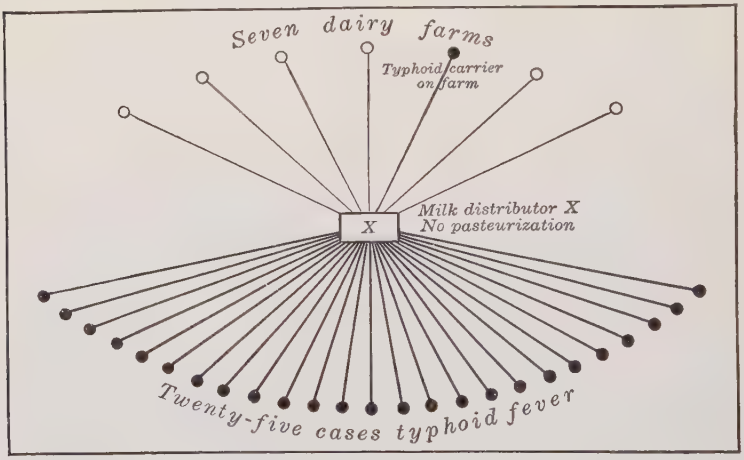
break of any disease which may be carried by milk. Any milker who has typhoid fever, diphtheria, scarlet fever, or septic sore throat should stop milking or handling milk.

Even persons who are apparently healthy may carry disease through milking or handling milk. Such persons are called carriers. An interesting account of this method of transmitting disease is reported by the state department of health of Illinois. There was an outbreak of typhoid fever on a local milk route. This milk was delivered by a father and his son. The father delivered milk to the patrons on one side of the street, and his son to those living on the other side. Curiously enough nearly all the cases of typhoid occurred on the side of the street served by the boy. It was discovered that both father and son had had typhoid. Although the boy was not sick, the bacteria of the disease lived in his body. He was a carrier; and since he was none too clean in his personal habits he was doling out typhoid fever to the buyers of milk. Carriers of disease bacteria should never be allowed to handle milk or food.

Pasteurizing makes Milk Safe. Fortunately a way has been found to insure the safety of milk through what is known as pasteurizing. This is done by heating milk to about 140 degrees and holding it at this temperature for thirty minutes. This is about 70 degrees short of boiling. It does not alter the taste of the milk nor lower its food value, and it does kill those bacteria which cause

disease. Pasteurizing does not prevent the milk from souring, but it will not sour so easily.

Where pasteurizing has become popular, there has been a marked drop in both the sickness and the death rates.

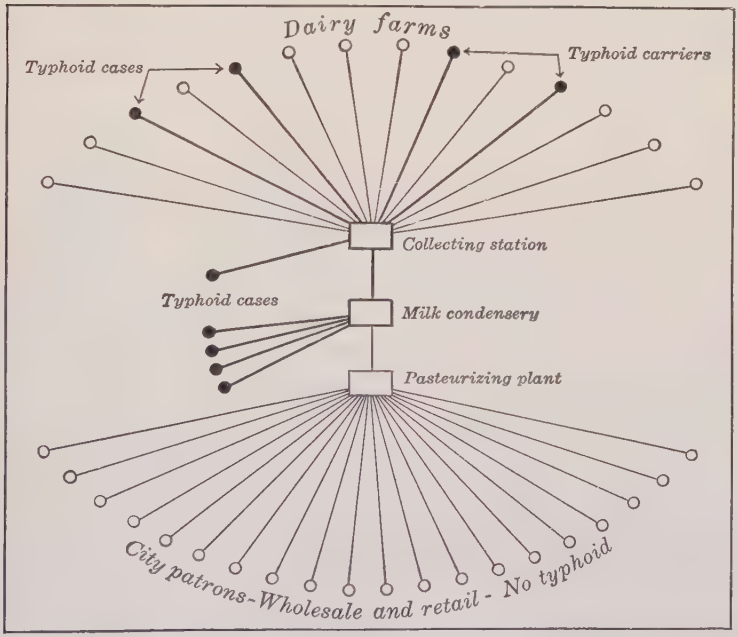


SPREAD OF TYPHOID FEVER

When the milk supply is not pasteurized a single typhoid carrier endangers the lives of many people

Keep Milk Cold. The best milk is that which is not over one hour old from the cow. How long it can be kept without souring or spoiling depends on how clean it is and how cold it is kept. Dirty, warm milk will sour in less than one day from the time it leaves the cow. Clean milk will not sour for days if it is kept at the right temperature. The reason for this is the inability of the bacteria which cause the souring to develop fast in cold milk. Immedi-

ately after milking, the milk should be cooled to 50 degrees and should be kept at or below that temperature until it is marketed. As soon as milk is delivered, it



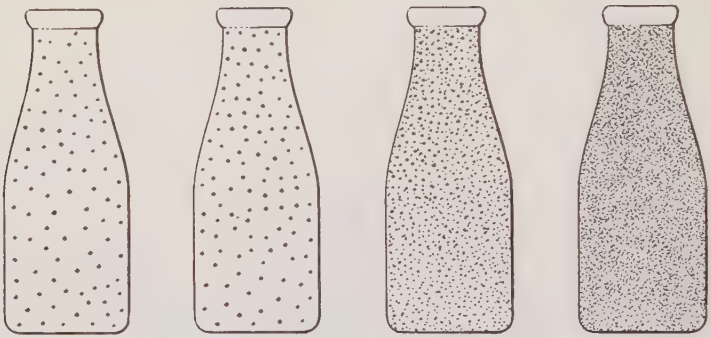
SPREAD OF TYPHOID FEVER STOPPED

Notice how pasteurization protected the customers

needs to be put into the refrigerator or a cool place if it is to be kept sweet and suitable for general household use.

Milk Inspection. States and cities do not all have the same laws concerning milk; but in many places there are inspectors who go about testing the milk in the market to

make sure that it comes up to certain standards. Inspection may go as far as an inquiry into the health of the cows, the condition of stables, and the way in which milk is handled from the farm to the consumer. Two of the common tests of milk are for its temperature and for its



BACTERIA IN MILK

a, fresh milk; *b*, milk kept on ice twenty-four hours; *c*, milk that has stood on a window ledge twenty-four hours; *d*, milk kept in a warm room twenty-four hours. (Courtesy of the Indiana State Board of Health)

amount of butter fat. It should be cold enough to limit the growth of bacteria, and the butter fat should be at least $3\frac{1}{4}$ per cent of the total quantity.

Remember

1. Milk is an almost perfect food.

2. Milk is lacking in iron. This can be supplied by eating plenty of green vegetables.

3. Milk often is contaminated.

4. Milk should come from healthy cows and be handled by persons who have clean habits.

5. Milk spoils readily.

6. Spoiled milk is harmful, especially to babies and children.

What other facts do you remember from the reading of this chapter?

Health Habits

1. Drink a quart of milk every day. Avoid tea and coffee.

2. Keep your milk in a clean, cool place.

3. Before buying milk make sure that it is pure.

Name other health habits concerning milk.

Things to Do

1. Have a committee write to your state department of health, the United States Department of Agriculture, and the United States Bureau of Education, Washington, D.C., for free pamphlets on milk.

2. From the sources named above get information on how to make an iceless refrigerator. Make one as a part of your work in manual training.

3. Send a committee to your health department to find out how it protects the milk supply. Report to the class.

4. Visit the best dairy in your community. Report to the class on the methods used to supply pure milk.

5. Find out what grades of milk are sold in your neighborhood. What is the difference between Grade A milk and other grades?

6. Study carefully the diagrams on pages 294 and 295. What do they teach?

7. Make some posters about milk.

8. Make for your mother a book of recipes for dishes that can be made out of milk.

9. Make a scrapbook telling the complete story of the glass of milk you have on your table.

10. Make a scrapbook about milk drinkers—children, grown-ups, and animals.

11. Prepare an article for your local newspaper on the production and use of pure milk.

Review and Thought Questions

1. Why is human milk better for babies than cow's milk?

2. What makes cow's milk superior to any other one food?

3. What other foods are desirable to supplement cow's milk?

4. How may a sick cow endanger the health of the community?

5. What care should be taken in milking?

6. What is a typhoid carrier? Should a typhoid carrier ever be allowed to handle milk?

7. What is the process of pasteurizing? Does it pay? Explain.

8. Why should milk be cooled immediately after milking, and kept cool?

9. What is the danger in allowing the milkman to pour the morning's milk into an open dish placed on the doorstep?

10. Why is milk better food than lollipops?

CHAPTER XXXIII

WAR ON INSECTS AND RATS

When Mosquito was King. In the early part of the sixteenth century Balboa, from the top of a mountain in Central America, first saw the Pacific. The beautiful foliage and the great expanse of water in the distance must have appealed to him as it did to those other hardy adventurers who followed after him. The Spanish, French, and English waged bloody warfare from time to time for the possession of this land. It was easy to see that when transportation was established across the Isthmus of Panama, there would be a short route between the East and the West. It would be the key to an immense trade.

White men fought for the Isthmus in vain, for there was something there stronger than themselves. That was yellow fever. For centuries the Isthmus was known as "the white man's grave." Still men battled to possess what is now known as Panama. In 1855 a railroad was built across the Isthmus, but every tie cost the life of a man. In 1881 a Frenchman by the name of Ferdinand de Lesseps dreamed of a canal which should unite the two great oceans. His engineers and workmen died so fast that he was compelled to give up his scheme.

Although nobody knew it at the time, the mosquito was king of Panama. As long as he ruled there, no canal could be dug. It was not a safe place for white men.

Major Walter Reed, Health Hero. An American army surgeon, Major Walter Reed, won fame by proving King Mosquito to be a criminal, a murderer in the first degree.

AS LONG AS THE MOSQUITO WAS KING MAN WAS POWERLESS

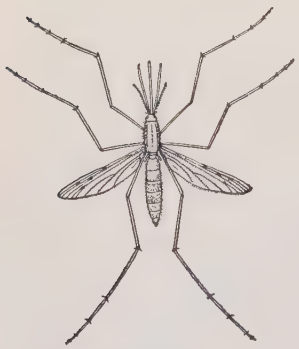
After the Spanish-American War Major Reed was made chairman of an army board to find out the cause of yellow fever. Carroll, Lazear, and Agramonte were other members. At least four soldiers out of every five at that time were ill with yellow fever and other tropical diseases. The American army was useless as a fighting machine.

It was generally believed then that yellow fever was spread by filth and infected articles of bedding, clothing, and furniture. Acting on this idea, Dr. Gorgas, who had charge of the health work at Havana, had made the city, in his judgment, the cleanest city in the world. But the yellow fever did not diminish. It was particularly prevalent in the cleanest part of the city.

There was also the unproved theory that the mosquito was the cause of the disease. Dr. Carroll allowed himself to be bitten by mosquitoes that had fed on yellow-fever patients. He soon fell ill with the fever. Dr. Lazear also allowed himself to be bitten by mosquitoes, fell ill, and died. He was one of the many health heroes who have given their lives that disease might be conquered.

Shortly after this, Camp Lazear, named in honor of Dr. Lazear, was established. There were two cottages: in one the ventilation was very poor; the other had good ventilation, and a mosquito-tight screen separated it into two parts. Both cottages were so well screened that they were mosquito-proof. In the first cottage three men wore clothes and slept on bedding used and soiled by yellow-fever patients. They did this for twenty days, but not one had yellow fever. In the other cottage those on one side of the screen allowed themselves to be bitten by mosquitoes that previously had bitten yellow-fever patients. Ten persons caught the disease. Those protected on the other side of the screen remained in perfect health.

Walter Reed and his brave companions had proved the guilt of the mosquito. They discovered that one kind of mosquito, the stegomyia, carried the disease. It is only the female who can carry the disease, and then only after having bitten somebody during the first three days of illness from yellow fever. It is now known that when the mosquito bites a yellow-fever patient, she sucks up some of the blood containing the infection. Although the bacteria of the disease have not been discovered, they doubtless live within the mosquito and then are injected into the body of the next person bitten.

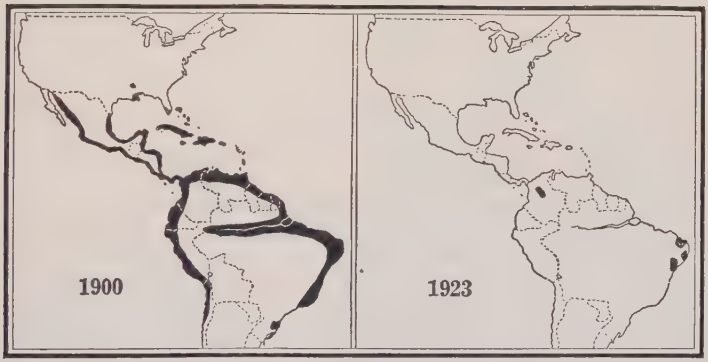


THE STEGOMYIA MOSQUITO

King Mosquito Dethroned. General Gorgas now carried on a campaign in Havana to destroy the mosquitoes and to screen those who had yellow fever. The war was carried on also against the anopheles mosquito, which was responsible for malaria. Deaths from yellow fever were reduced from 310 in 1900 to 18 in 1901. Deaths from malaria were reduced from 325 in 1900 to 51 in 1901 and to 4 in 1912.

When the United States decided to dig the Panama Canal, it was realized that the Canal could never be dug until Panama was made a healthful place. General Gorgas

was called upon to take charge of the health work. He began his destruction of mosquitoes in 1904, and in two years yellow fever had disappeared. What was once the white man's grave has now become one of the most healthful and delightful spots in the world. King Mosquito had been dethroned! The great canal was completed.



THE FIGHT AGAINST YELLOW FEVER

The black areas on the maps show the presence of yellow fever. What happened in twenty-three years? Why?

General Gorgas spent his life in overcoming disease, and his advice was sought throughout the world. Kings and queens were proud to honor this great American who had done much for the safety, happiness, and prosperity of the world.

Health Today in Panama. The Panama Canal Zone is today one of the greatest show places of the nation. Thousands of tourists visit the Zone every year. It is Colum-

bus's dream of the short route to the Indies come true; it is the nation's greatest monument to engineering and sanitary skill. What was once a death trap has become one of the most healthful spots on the globe. As one means of fighting disease in this tropical country where the health problem bristles with the greatest difficulties, the Panama Zone has been made almost immaculate in its cleanliness. The schools, houses, streets, and lawns are shiningly neat. On the school grounds, park lawns, and sidewalks not a crumb, not a fruit skin, a peanut shell, or a scrap of paper is to be found. In a country where every fly and mosquito is probably a carrier of disease, a public opinion has been created which demands cleanliness because it is of vital importance to health. Children who read this book will be interested to know that in the Panama Canal Zone mosquitoes are to be reported if found indoors at school. Failure to report is regarded as in the nature of a crime. Flies are almost unknown.

GENERAL GORGAS

American health hero, who dethroned King Mosquito in Panama

Some children born in Panama have seen their first flies when traveling northward to the United States.

Because of these great health achievements we are likely to think of the children of the Panama Zone as being unusually healthy. Miss Sally Lucas Jean of the American Child Health Association, who visited the Zone in 1924, reports that this is not so, for something else is needed for healthful living besides pure water, freedom from disease, and healthful surroundings. To be healthy, children need also to form the various health habits presented in this book. Miss Jean says that the beautiful, languorous evenings are a great temptation to late hours. Yet these children need sleep as much as children do in Chicago or on the farm. The people there also have the "canned-food habit" and eat only a limited amount of green vegetables. With their superbly healthful surroundings the children of Panama will have advantages superior to those of most children when they form more of the habits essential to health.

Protection against Mosquitoes. The mosquitoes which carry yellow fever and malaria are the only ones in our country which carry important diseases, and then only after they have become infected. The ordinary mosquito, called culex, is harmless although very annoying. Only the expert can tell the difference between these mosquitoes; therefore it is wise to protect ourselves against all mosquitoes as much as we can.

These methods for protection against mosquitoes are to be recommended:

1. *Destroying their breeding-places.* Mosquitoes lay their eggs in water or in damp soil. The eggs hatch out

© Keystone View Co.

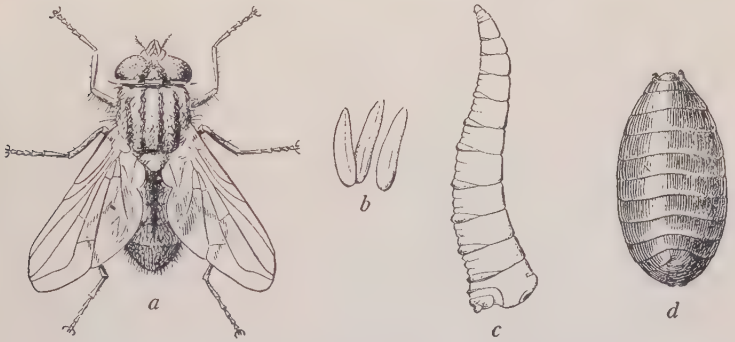
OILING A NATURAL BREEDING-PLACE FOR MOSQUITOES

into wigglers and then develop into full-grown mosquitoes. Draining marshes and swamps, filling up holes, getting rid of rain barrels and cans that collect water, help to get rid of mosquitoes.

2. *Stocking the breeding-places with minnows.* It is estimated that each minnow will devour about one hundred and sixty-five wigglers in a day and many eggs.

3. *Oiling breeding-places.* The oil forms a film over the top of the water so that the wigglers find it difficult to breathe, and finally die. It also poisons them.

4. *Using larvicides.* These are poisonous liquids. They can be mixed with the water at breeding-places.



STAGES IN THE LIFE HISTORY OF THE FLY

a, the adult fly; *b*, eggs; *c*, maggots; *d*, pupa stage from which a new fly comes

5. *Screening.* All houses in localities that have mosquitoes should be screened. Great care should be taken to keep mosquitoes away from the sick.

6. *Repellents.* Campers and others who are not so well protected as in their own homes put some kind of repellent on their faces and hands, or on cloths which they hang near their beds or carry in their hands.

The Filthy House Fly. One of the most filthy insects known to man is the house fly. It lays its eggs in garbage,

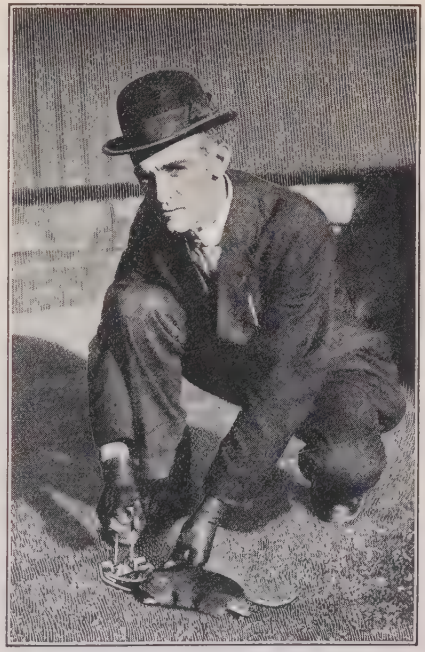
manure, or some other filth. The eggs hatch out into maggots. The maggots turn into hard objects called pupæ, that finally turn into flies. Flies have the most disgusting habits of wallowing in filth and then dropping into food or wiping their feet on it. Since filth usually contains disease bacteria, flies are a constant menace to health. They are responsible for carrying typhoid and summer complaint.

Protection against Flies. If there were no filth, there would be no flies; therefore the way to get rid of flies is to get rid of filth. Clean streets, alleys, yards, and barns prevent them from breeding. A favorite breeding-place for flies is manure. This should be kept in air-tight containers or be spread very promptly on ground that is to be plowed.

If flies cannot be prevented entirely from breeding, screens, swatters, traps, and fly paper should be used.

The Louse. Lice have been a great scourge to the world. The louse is responsible for the carrying of typhus fever, trench fever, and a number of other diseases. During the World War one of the serious problems was to keep the men free from lice. Bathing, frequent changing of underclothing, and inspection of the soldiers were some of the ways in which body lice were kept down. When our troops returned from France they were thoroughly deloused before being discharged. Whether in war or in peace, lice are dangerous.

The head louse belongs to the same family as the body louse. It is a nuisance and may irritate the scalp. To get rid of lice the head should be washed with equal parts of kerosene and vinegar and combed. The kerosene kills the lice, and the vinegar separates the eggs from the hair. In the case of boys the hair should be cut short.



A MODERN PIED PIPER

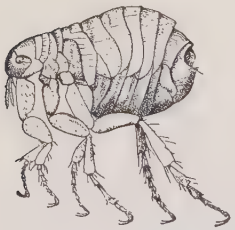
This man is a professional rat catcher employed by the Boston Department of Health

Rats and Fleas. During the fourteenth century twenty-five million people in Europe lost their lives from bubonic plague; some communities were nearly wiped out. The cause of the disease was unknown then, but we know now that it was carried by fleas. There are over five hundred different kinds of fleas in the world, but only the rat flea carries the plague.

Whenever the plague breaks out now, the first thing to do is to kill the rats. When the plague threatened in San

Francisco a few years ago, over a million rats were destroyed. Some of the large health departments have professional rat catchers and men who examine the rats in laboratories to find out whether they are infected with the plague. The rat flea cannot carry the disease unless first of all it bites a rat who has the disease.

Rats should be destroyed to prevent the possible spread of the plague and also because they are very destructive of property. One way to get rid of the rat is to starve him to death. Rat-proof buildings especially for food storage, and not exposing food where rats will find it, help greatly to destroy rats. Poison and traps also help to destroy them. Poison should never be placed within the reach of young children. Contrary to general opinion, dogs and cats are not very effective rat catchers.



A RAT FLEA, HIGHLY MAGNIFIED

Fleas other than rat fleas can usually be kept out of the house by keeping floors and rugs clean and by keeping domestic animals, such as dogs and cats, away from the house. They should have sleeping-places outside, and their beds should be cleaned regularly by spraying with a coal-tar disinfectant. A 3 per cent solution of creosol may be used to wash pets.

There is always danger in scratching fleabites because of possible infection. It must be remembered that any

break in the skin may be dangerous. Moist toilet soap smeared over the punctures will soon relieve the irritation.

Remember

1. Many insects carry disease.

2. It is our fault if the mosquito becomes king.

3. The house fly is one of the filthiest of insects.

4. The louse is something more than a nuisance: he is an enemy of good health.

What other facts do you remember from the reading of this chapter?

Health Habits

1. Protect against mosquitoes by draining the breeding-places and by using screens. See that no tin cans or other receptacles are left about to catch water and serve as breeding-places.

2. A clean house does not attract flies. Keep the house clean.

3. Flies breed in manure and garbage. Haul these away.

4. Keep the garbage can clean.

5. Lice breed on filthy people. Keep clean.

6. Fleas breed in the dust on floors and in carpets. Keep the house clean.

What other health habits would you suggest?

Things to Do

1. Look over all your screens at home. Repair them. Report to the class.

2. Tell the story of General Gorgas, the health hero. Find out more facts about his life.

3. Tell the story of Major Walter Reed. Find out more facts about him.

4. Make a fly trap. Write to the International Harvester Company, Chicago, inclosing a two-cent stamp for directions.

5. Have a committee to inspect school and home premises to find out whether there is any stagnant water where mosquitoes may breed. Get rid of the breeding-places.

6. Have a rat-catching and rat-killing campaign.

7. Appoint a committee to write to your state department of health and to the Department of Agriculture, Washington, D.C., for further information about rats, flies, mosquitoes, lice, and fleas.

8. Appoint a committee to report on the garbage cans and manure boxes around the school.

9. Write a play about the community that made war on rats or some of the insect pests referred to in this chapter.

10. Write a play, telling about the achievements of General Gorgas and Major Reed.

11. Write some health songs in connection with this chapter.

12. Make some health posters.

Review and Thought Questions

1. What insect was king of Panama?

2. Whom did this king conquer? Who dethroned him, and how?

3. Why did De Lesseps fail to dig a canal across Panama?

4. What was the old theory about the spread of yellow fever?

5. How did Major Reed and his brave companions prove that this theory was wrong?

6. What made the construction of the Panama Canal possible?

7. How may we protect ourselves against mosquitoes?

8. Where do flies breed? Through what stages do they pass? Why are they a menace to health?

9. In what different ways may we protect ourselves against flies?

10. What was the danger from lice during the World War? Are they a danger also during peace? How? What can we do to protect ourselves against them?

11. How do rats and fleas do harm? How may we protect ourselves against them?

CHAPTER XXXIV

HOW CHILDREN MAY HELP THE COMMUNITY

Children as Citizens. We sometimes think that only grown-up folks who vote are citizens. This is not true. Children are citizens as much as adults, although they do not have all the privileges, such as voting, that their fathers and mothers have.

Every community does a great deal for its citizens. It provides roads, cleans the streets, furnishes pure water, insures the safety of the milk supply, and provides police protection and public-health officers who look after the health of the community. To make a community a more beautiful and healthful place in which to live, every citizen needs to help. Good laws are helpful only when citizens obey them. The health of the community depends on the good will and helpfulness of every citizen.

Helping at Stoughton, Wisconsin. Children throughout the country are beginning to do their bit for the health of the community.

At Stoughton, Wisconsin, the pupils in the upper grades of the public schools made a very good report on influenza in their town. This was soon after the epidemic of influenza in 1918, when it was predicted that the disease

would reappear shortly. These alert boys and girls called at every house in town and found out who had had influenza, who had escaped it, and who had died from it. They found out also what remedies had been used to cure

© Publishers' Photo Service

LOYAL SCOUTS

"We believe in doing somebody a good turn every day"

and relieve it, what effect these remedies were thought to have had, and what measures of prevention were employed.

Other pupils interviewed the health department and the physicians of the town. Others went to the state capitol and got all the information they could from the state

board of health. Others read about the disease. All this information was put together in a small book, which was distributed among the people of the community. This booklet was of service in informing the people at large about the prevention and treatment of influenza.

Isolation on Suspicion. In Shorewood, a suburb of Milwaukee, the parents, pupils, and teachers agreed to work together to lessen the amount of contagious disease. It was agreed that the teachers and children would look over the class when they came together each school morning, and would immediately send home all those who had symptoms that might mean coming illness. The children agreed to go home. The parents agreed to keep them at home, away from other children, until it was certain that they were not developing any form of contagious disease. Teachers, parents, and children all worked hard for good health at Shorewood. The plan was called "isolation on suspicion."

Inspecting Food. In many places children at school have made food analyses and inspection for their own homes.

Children have done a good deal with milk. In some schools they are told to bring a bottle of milk from home in just the condition it was in when it was delivered. Sometimes the children are asked to report the hour when the milk was delivered and whether it was left in a hot, dirty place.

The milk bottles are then inspected by the class for cleanliness of the bottle and cap. The bottom of the bottle is carefully examined for dirt in the milk. In some schools there is a filtration apparatus for making the dirt test. In such schools each bottle is given a dirt test. Sometimes the cotton showing the dirt obtained from the milk is sent home.

In some cases children have made very full reports of the milk business of their communities.

SELLING CHRISTMAS SEALS

This little girl helps by doing her bit. (Courtesy of the Boston Tuberculosis Association)

Health Slogans in Mississippi. Down in Monroe County, Mississippi, the school children helped to teach health in a very unusual way. The public roads were marked by mileposts erected by the local business men, the county health officer, and the public schools. Each milepost carried a health slogan written by some school child. These slogans were selected from a long list written by school children. In addition to this slogan and a statement of the distance from the county seat, each post car-

ried an advertisement of a business house in the town. The business houses paid for making and placing the sign-posts. The children of a school district agreed to report to the county health officer every post that got into bad repair or was knocked down or otherwise displaced.

More-Sleep Campaign. In Sioux City, Iowa, the members of the Parent-Teacher Council began a campaign to help the children get more sleep. The council drew up an agreement to be signed by parents. In this agreement they promised to make every reasonable effort to have their children in bed not later than 8.30 P.M. (nine o'clock for junior high school) five nights in the week during the school year. The school children became interested in a competition to see what school could obtain the largest number of parents' signatures. Buttons with a clockface having the hands pointing to 8.30 were given to the children whose parents signed the agreement. In this way both parents and children worked together in the sleep campaign which was to make the children healthier and more alert.

Little Mothers' Clubs. In July, 1911, a family in Chicago was left motherless. The father was obliged to be absent from home during the day. It fell to the lot of the eldest child, a lad of seven, to look after his four younger brothers and sisters. The youngest was an infant of six months. The problem was too much for the brave boy, who appealed to a settlement house for help.

This was the beginning of Little Mothers' Clubs in Chicago. A nurse from the health department assembled a company of boys and girls in the kindergarten of the settlement. The ticket of admission was "One small baby what can't walk." These boys and girls received information on how to take care of their small charges. The next month four schools for little fathers and mothers were opened in different parts of the city. Since that time they have spread throughout the city. Many cities in America now have Little Mothers' Clubs.

Junior Public Health Organization. The commissioner of health and the public health nurse of Cobb County, Georgia, had 68 schools to look after. These schools were many miles apart. It was a big responsibility for two people to undertake to care for the health of so many children. No wonder they felt discouraged. With hard work and the best of good luck they could hardly expect to visit each school more than once a year. During their long absence the children would forget all about their message of health. They were working under serious handicaps. Then they decided to offer the children in the schools some responsibility. This led to the founding of the Junior Public Health Organization in Cobb County, Georgia. In each of the 68 schools a commissioner of health and a junior public health nurse were either appointed by the teacher or elected by the pupils. The junior commissioner of health was held responsible

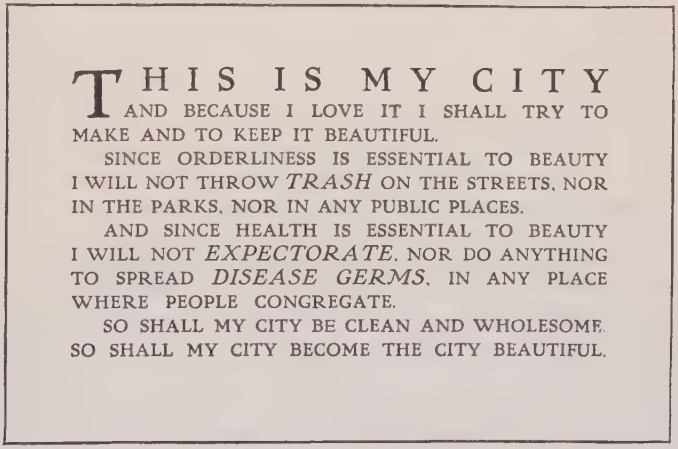
chiefly for sanitation and the reporting of communicable diseases. The personal hygiene of the school and the reporting of the correction of physical defects were largely the responsibility of the junior health nurse. Both these junior officers were given instruction in the performance of their duties by the health commissioner and public health nurse of the county. The junior officers sent in reports from their schools every week. The pupils were eager workers. This meant that the 68 schools of the county were doing their part as good citizens to be healthy.

The junior commissioner of health filled in this form each week:

NUMBER OF PUPILS ABSENT FROM SCHOOL? ....
NUMBER ABSENT ON ACCOUNT OF PERSONAL ILLNESS? ....
NUMBER OF DISEASES REPORTED? ....
DID YOUR SCHOOL USE INDIVIDUAL DRINKING CUPS? ....
WERE FLOORS OF SCHOOLROOM KEPT SANITARY? ....
WERE FLOORS SWEPT WET? .... WATER USED? .... OIL USED? ....
WERE ROOMS KEPT WELL VENTILATED? ....
TYPE OF TOILET USED? ....
WAS IT KEPT SANITARY? ....
HOW WERE PAPER AND GARBAGE DESTROYED OR OTHERWISE DISPOSED OF? ....
ANY IMPROVEMENTS MADE? .... WHAT? ....

Sanitary Surveys. In some communities school children have rendered a great service by making sanitary

surveys. One of the most successful of these was undertaken in a county in Arkansas as a part of the health-crusade movement. The county was divided into sanitary districts. A pupil was chosen as a sanitary officer or leader. Under him there were a number of subleaders.


THIS IS MY CITY
AND BECAUSE I LOVE IT I SHALL TRY TO MAKE AND TO KEEP IT BEAUTIFUL.
SINCE ORDERLINESS IS ESSENTIAL TO BEAUTY I WILL NOT THROW TRASH ON THE STREETS, NOR IN THE PARKS, NOR IN ANY PUBLIC PLACES.
AND SINCE HEALTH IS ESSENTIAL TO BEAUTY I WILL NOT EXPECTORATE, NOR DO ANYTHING TO SPREAD DISEASE GERMS, IN ANY PLACE WHERE PEOPLE CONGREGATE.
SO SHALL MY CITY BE CLEAN AND WHOLESOME. SO SHALL MY CITY BECOME THE CITY BEAUTIFUL.

A GOOD-HEALTH POSTER

This poster was used in a clean-up campaign in Harrisburg, Pennsylvania. Make a similar one beginning with "This is My School"

Five purposes were set: to screen each house against flies, to get each householder to use a covered garbage can, to darken all vaults so that flies would not enter, to cause manure to be removed once a week, and to make streets, alleys, and premises clean and sightly.

Each householder in the county was visited and was told about the plan. Printed slips were used by the visi-

tors for checking the conditions found. Findings were noted by different-colored pins on a large map in the office of the superintendent of schools. This work was done by pupils in the high school and seventh and eighth grades. So well was this work done that in one city with a population of thirty-five thousand only eight householders failed to comply with the requirements.

In the country districts tests were made of the water from every well, the work being done at the high-school laboratories. Much infection was found. When the users of the water were unwilling to do anything to improve conditions, permission was asked to put a quart of kerosene in a toilet near. In many of these cases the kerosene was tasted in the well water and the true condition of the well realized. As a result sixty-three new wells were dug in that county, and there was a material decrease in the number of cases of typhoid.

Remember

1. The good citizen helps the community.
2. Every pupil in our schools is a citizen.
3. Children are doing much to improve the communities where they live.

What other facts do you remember from the reading of this chapter?

Health Habits

1. Practice the rules of healthy living for your own health.
2. Do what you can for the health of others.

Things to Do

1. Organize a campaign for cleaning up front yards and back yards.

2. Make up a score card for studying your neighborhood.

3. Think of other things to do to help your community.

4. Put on your bulletin board clippings that tell about helping the health of communities.

5. Pick out some bad condition in your neighborhood and organize to remedy it.

6. Form societies to discourage spitting, to prevent colds, to kill flies, to prevent the breaking of quarantine.

7. Make out a list of things that you think a junior public health nurse of Cobb County, Georgia, might have reported on weekly.

Review and Thought Questions

1. What do your town, city, and state do for their citizens?

2. What does a citizen owe to his community?

3. Why should a citizen help others to keep healthy as well as to keep healthy himself?

4. Several stories were told about school children's helping their communities. Where was each community located, and what was done in each case?

5. Which groups investigated something that had happened?

6. Which groups stayed on the job to see that the plan was carried out?

7. Which groups did most for community sanitation? for the development of health habits?

8. Do you know of any group of girl or boy scouts that have done something for the health of their community?

CHAPTER XXXV

KEEPING HEALTHY IN COUNTRY AND CITY

Advantages of the Country. People who live in the country ought to be healthier than those who live in the city, because the country naturally has more advantages.

First, there is more space in the country. The homes are not crowded together, and people rarely meet in crowds or in close contact. This helps greatly to protect them against the spread of disease, for bacteria which cause disease usually live in the bodies of people. As a rule communicable diseases are present constantly in the city, whereas in the country they come and go. There may be months and years when a country population will have none of them. The practice of the rules of health should fully protect people who live in the country.

Country people also have the chance to get more sunlight, fresh air, and exercise than city people. The houses have wide spaces between them, and the sun can get into them and all around them. The air is freer from dust. The work on the farms also takes men and women and children out into the open air. Nearly all country work requires more muscular exercise than city work.

Most of the food in the city must come long distances, with the chance of spoiling or being handled by many persons who may not always have the very best health habits. Milk, eggs, fruits, and vegetables are more likely to be fresh and clean in the country than in the city.

A VEGETABLE GARDEN HELPS TO INSURE GOOD HEALTH

Disadvantages of the Country. Nature does so much for the people in the country in the way of furnishing them with air, sunshine, and food that they are often quite careless about matters of health.

The man who lives in the country is not as healthy as he easily might make himself. He is likely to be careless

about the water he drinks. This he can guard by locating his well where it will be safe from pollution, or he can sterilize the water with heat or chemicals.

The country man is apt to be careless about his milk. This can be guarded against by providing proper care of

A SANITARY MARKET

stables and cows and modern ways of handling the milk. The milk may be heated, tuberculosis may be eliminated from the herds, and sick people and disease carriers may be eliminated from among those who handle the milk.

The man who lives in the country is likely to be careless about flies also. These can be guarded against by not permitting manure piles to become breeding-places.

Although he may think that he gets enough exercise, the man who lives in the country would be in better condition if he played more and went through some special exercises every day. Unfortunately he is likely to develop bad posture.

Advantages of the City. Although the city has many disadvantages, it is often a more healthful place in which to live than the country. The water supply is likely to be carefully purified by the city. Even the milk, which may be brought a long distance, is usually inspected and often pasteurized. Usually there are school doctors, nurses, and playground directors who look after the health of the children. Hospitals and clinics are helpful in making people healthy.

Disadvantages of the City. The people who live in cities are crowded together. Several hundred of them often live on a single acre. They come in close contact in the street cars and in halls of assembly. When any kind of contagious disease gets into such places, it spreads easily because of these close contacts. The houses being close together, sunlight and air do not have a chance to sterilize the earth, the paving, and the floors.

The darker-complexioned children of both the white and colored races almost all have rickets, because they do not get enough sunlight while they are growing up. To overcome this, cities have laws regulating buildings, air spaces, and light-courts.

The people in the city are more liable to have pneumonia and consumption. This is partly because they do not get enough sunlight, since the buildings are too high and too close together, and partly because there is too much dust and smoke in the air and because there is poor ventilating in all sorts of houses.

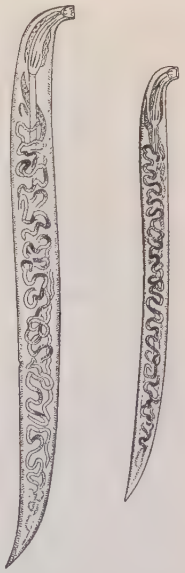
The opportunity to take physical exercise in the city is not so good as it is in the country. The man in the country must exercise to make a living. The average person in the city can do his work of making a living without getting enough exercise to keep himself physically fit. Much of his work is done indoors. To overcome this difficulty cities provide parks, playgrounds, open spaces, gymnasiums, and athletic fields.

In spite of the many disadvantages of the city, the draft during the World War showed that men from the city are about as healthy as those from the country. This is probably because they are more careful in their practice of health habits.

Health in Villages and Towns. The conditions in villages and towns are likely to be less favorable for health than in either the country or the large city. The people live fairly close together, so that there is more chance for the spread of disease than in the country. Unlike cities, villages are apt to have no adequate way of disposing of sewage, garbage, and manure. Outhouses and stables are apt to be nuisances, and the water and milk supplies often

are not protected. Rarely do villages have school health inspection and a school nursing service.

Hookworm in the Country. In some sections of the United States from 75 to 80 per cent of the people have hookworm. This is a worm which in its adult development is a third of an inch to half an inch in length. It clings to the wall of the intestine by means of a hook and sucks blood. It manufactures a poison, which leads to the destruction of red corpuscles, loss of vitality, and the stunting of physical and mental development. In communities where hookworm is common the entire population may be pale and undersized, lacking in ambition, and living under revolting conditions of poverty. The female hookworm produces large numbers of eggs, which are discharged with intestinal wastes. They may live a long time in the soil until they come in contact with a human body, where they make their home. Hookworm always undermines health.



HOOKWORMS HIGHLY MAGNIFIED

Although hookworm disease is widely spread in certain states, the prevention and cure of this disease are relatively simple. The soil must not be polluted. This requires the building of suitable outhouses to dispose of

bodily wastes. Hookworm can be prevented also by wearing shoes. A number of doses of medicine prescribed by a physician will rid the body of practically 100 per cent of these bloodthirsty guests. Through a vigorous campaign

A MIRACLE OF MODERN MEDICINE

This shows a girl before and after treatment for hookworm

of education this menace to health is gradually disappearing in rural sections, where it has been most prevalent.

Good Health is Possible Anywhere. Whether one lives in the country or city or in a village or town, he can purchase continued good health. The price he must pay is liv-

ing according to the laws of health. This may cause a little trouble and take a little time, but the results will pay. The man who lives in the country cannot afford to trust to nature to protect him. The laws and habits of health are the same for the man in the country as for the man in the city.

Everybody, no matter where he may be, should practice the rules of personal hygiene (see page 12). In addition to these there are particular rules of community health that need to be observed. These are some of the most important:

1. Protect the water supply from pollution.

2. Dispose of garbage safely. See that sewage is properly disposed of and protected from flies.

3. Guard against flies, mosquitoes, and rats.

4. Protect the milk supply by getting milk from healthy cows. Milk should be handled by clean people.

Remember

1. The country has space and fresh air.

2. The city is usually careful about its water and milk supply.

3. To be healthy in either city or country, one must practice health habits.

What other things do you remember from the reading of this chapter?

Health Habits

1. Avoid drinking from brooks or streams.

2. Do all you can to protect the health of others.

3. Help to dispose of all garbage safely.

Name other health habits.

Things to Do

1. Make a list of all the advantages and disadvantages of the city in the matter of health.

2. Make a similar list for the country.

3. Have a debate on the proposition, Resolved, that the country is a more healthful place to live in than the city.

4. Appoint committees to make reports on the advantages and disadvantages for health of the district in which your school is located.

5. Write to the Metropolitan Life Insurance Company, New York, for one of their free bulletins on hookworm.

Review and Thought Questions

1. Why is space important for health?

2. Are crowds generally conducive to health or not?

3. What advantages do country people have in regard to foods? What disadvantages?

4. What careless health habits are especially dangerous in the country? Why?

5. Why do people who live in the country need physical exercise?

6. What health habits do city people need to form?

7. What are some of the disadvantages, from the point of view of health, a village may have?

8. What kind of argument would you make to show that good health is possible in either the country or the city?

9. What is hookworm? What is its effect on communities? Where is it prevalent? How may it be combated?

CHAPTER XXXVI

KEEPING HEALTHY DURING TRAVEL AND VACATION

The Vacation Habit. One of the very best habits that people have is the vacation habit. It is usually a very good thing for one's health to get away from work for a time each year, enjoy a change of scene, and have a rest. A good vacation makes people fitter physically during the remainder of the year and helps them to accomplish more work.

It sometimes happens that one returns from a vacation in a worse condition than when he went away. One reason for this is overfatigue, missing the regular amount of sleep, and an excessive amount of excitement. There is a familiar joke about getting over a vacation on returning home. If health habits are forgotten during the vacation, it may be better for one to remain at home and do his regular work.

The Hygiene of Traveling. Frequently people do some traveling during their vacation. At such times their manner of living is changed, and they need to remember a few very important things about their personal health.

1. Avoid people who cough and sneeze and seem ill.
2. Be careful not to overeat.

3. Avoid hotels that do not seem clean.

4. Avoid using any common toilet supplies, such as combs, brushes, towels, and drinking-cups. Disease is carried by such things. Use individual toilet articles.

CHOOSE A SANITARY RESTAURANT WHEN YOU ARE ON YOUR VACATION

5. Avoid eating-places where the waiters, tables, and room seem unclean or where flies buzz about the food.

A First-Aid Kit. Since people are likely to do unusual things during a vacation, it is a good plan to take along a first-aid kit for any of the common vacation accidents that may occur. This is especially true if one is going camping or to some remote place where drug stores and doctors are not at hand.

Such a first-aid kit might well include the following:

A bottle of alcoholic iodine to sterilize fishhook wounds and other wounds and cuts.

A package of gauze.

A package of bandages.

Some cathartic, such as castor oil or purgative pills.

Be Careful of Water and Milk. When spending a vacation one should always inquire into the purity of the water and milk supplies. This is especially desirable if one is camping or spending the vacation in the country. If there is a likelihood that the water is polluted, one should drink only water that has been boiled or treated chemically.

If there is any suspicion that the milk supply is not safe, the milk should be boiled.

A Word to the Camper. The camper should be careful to protect his own health. He should also recognize a moral obligation so to pitch, equip, and maintain his camp that it will not pollute the ground or water. The simplest way to dispose of wastes is to burn or bury them.

Insects sometimes add to the discomfort of campers. Filth attracts flies. A clean camp may be a flyless one; a dirty camp never can be. Fly paper and fly swatters help to drive flies off. Insects that cannot fly and that bite generally can be killed by sulphur ointments. Repellents, such as oil of citronella, help to drive off mosquitoes.

Beware of Poison Ivy. People who go camping often suffer from ivy poisoning. The ivy is a creeper, or climb-

ing plant, with broad leaves, sometimes slightly notched, arranged in clusters of three. Nearly everybody who touches these leaves is likely to be poisoned. The poisoning shows itself in severe inflammation and swelling of the skin. The pain, itching, and discomfort are severe.

One of the simplest and best remedies for ivy poisoning is a wash of boracic acid solution in water, followed by ordinary zinc ointment smeared on the inflamed skin. The skin should then be covered with a thin cloth. The ointment should be removed daily with the wash, the inflamed skin dried, and the ointment applied again.

Remember

1. A carefully planned vacation is good for health.
2. Unless one considers his health, a vacation may be harmful.
3. With reasonable attention to health one may travel safely.

What other things do you remember from the reading of this chapter?

Health Habits

1. Plan your vacation for a good time with plenty of rest and recreation.
2. When traveling attend to the habits of cleanliness.
3. Sleep and eat in clean places only.
4. When gathering plants beware of poison ivy.

What other habits are necessary in traveling or on a vacation?

Things to Do

1. Plan a vacation. What health habits shall you need especially in traveling and on your vacation?

2. Plan a camping trip. What will you do to safeguard your health and the health of others?

3. Appoint a committee to get a copy of "Safe Vacations" from the United States Public Health Service, Washington, D.C. Let the committee report on facts not mentioned in this chapter.

4. Find a photograph of a poison-ivy plant. Let somebody draw a picture of the poison-ivy leaf on the blackboard.

Review and Thought Questions

1. What are the benefits to be gained from a vacation?

2. If one has the right kind of physical and mental habits, is it necessary to take a vacation?

3. What precautions for health should one take in traveling?

4. Why is a first-aid kit especially desirable for campers? What should a first-aid kit include?

5. How can water and milk be made safe?

6. Have your vacations helped to build up your health? Explain.

CHAPTER XXXVII

HEALTH IN INDUSTRY

A New Movement. If men and women are to do their work well and live long and happily, they need healthful conditions under which to work. It is only within the last twenty years that thought has been given to the health of the worker. About twenty years ago investigations were made which showed that workmen were doing the day's tasks with little or no protection of health. They might be working at granite-cutting or wood-cutting and breathing in dust and dirt, or in sweat shops provided with little air or light. Often they became diseased because of filthy toilets. Labor unions demanded better conditions, and employers saw that it was an advantage both to the workers and to themselves to have healthful conditions in the shops. The movement for industrial hygiene has led to the reconstruction of old buildings and the building of new factories that are models in lighting, ventilation, and toilet facilities. Some industries even provide shower baths, gymnasiums, and playgrounds for their employees.

Improving the Health of the Worker. Since attention has been given to the health of the worker there has been a decrease of tuberculosis in industry.

In certain occupations the danger from consumption, or tuberculosis of the lungs, is great. This is especially true in what is known as the dusty trades, although some dusts are more harmful than others. Workers in such

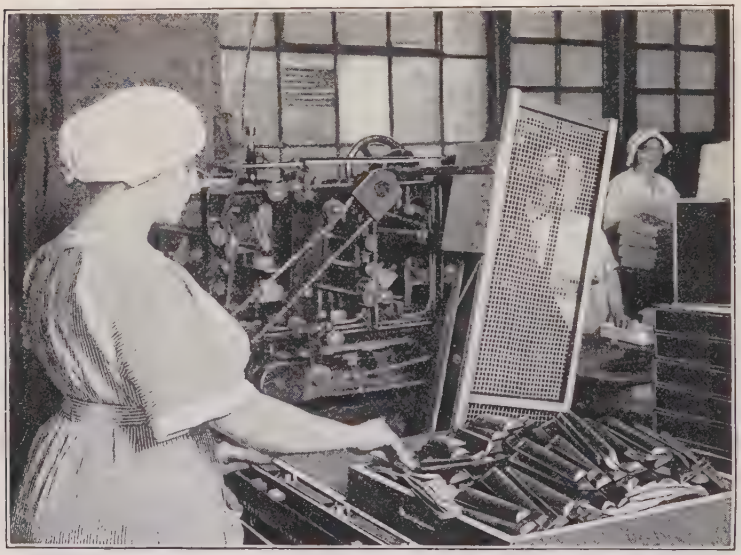
© Publishers' Photo Service

A SANITARY FACTORY

A clean, well-lighted, and properly ventilated factory helps to keep the worker in good health and insures a clean product

trades should wear something over the nose and mouth to keep the dust out. Many employers are required to provide also hoods and exhaust systems which suck the dust away from the room, and wet or oily applications for the surfaces worked in order to keep the dust down.

In certain of the trades the danger from soiled hands is even greater than it is from the air. Such places should have convenient and attractive facilities for thorough washing of the hands and face. In factories where



© Publishers' Photo Service

SAFETY DEVICE ON A WRAPPING MACHINE

This screen protects the operator's hands from the belt and machinery

poisonous chemicals are used or made, it is against the rules for the employees to chew tobacco or gum or to smoke or to eat their lunches in the workroom, or to eat without first washing the hands and face well.

In the latter part of the World War we heard much of mustard gas. This gas not only irritated the lungs when

air containing it was inhaled, but poisoned the skin whenever and wherever it touched it. In many factories where these chemicals are made or used, irritations and inflammations of the skin are produced. In such factories the employees bathe and put on fresh working-clothes before they go to work, and after working they bathe again and put on their street clothes.

Much of the skin disease that is called eczema results from poisoning common to certain industries. Grocery itch is an eczema due usually to handling sugar and other goods. Baker's itch comes from constant contact with flour. Housewives get eczema because they have their hands much of the time in water or soap and water. Photographer's eczema comes from working with chemicals. Dentists get eczema from handling certain drugs. Those who work in places where cutting-oils are used are apt to get boils.

In many of the industries where machinery is used, there is great danger from accidents. These are due to the use of machinery with no safety devices and to the carelessness of the employees. The installing of proper machinery and the training of the men in methods of safety have reduced these accidents greatly.

Medical Service in Industry. It costs the employer a good deal to train each worker; consequently every absence because of illness and every death means a loss in money to him. Every absence is also a loss to the worker.

In the best-regulated industries there is a medical service. It examines a man when he begins work to see that he is physically fit for the job he is to do, advises him how to keep well, and cares for his immediate needs in case of accident or illness.

Remember

1. Good health means money and happiness for the worker.

2. The good health of the workmen helps to make the factory owners prosperous.

3. Good health in industry requires sanitary factories.

4. Workmen must have health habits to keep well.

What other facts do you remember from the reading of this chapter?

Things to Do

1. Let your class appoint committees to visit several industrial establishments. Report on the sanitary conditions. In what way is the factory sanitary or insanitary? Is there a medical and nursing service? Do the machines have safety devices to prevent accident? Do the workmen have training in habits of health? Find out the most frequent cause of absence from work. What do you think could be done to decrease absence from this cause?

2. Find out whether there are any laws in your town, city, or state concerning the admission of children to industry.

3. Debate this question, Resolved, That no boy or girl should be permitted to work full time in any industry before the age of sixteen.

Review and Thought Questions

1. What were the conditions in industries before the movement for industrial hygiene?

2. Name some unhealthful trades.

3. Which trades tend to cause consumption?

4. Which trades cause skin troubles?

5. What is an industrial medical service?

6. What is being done by some factory owners to improve the health of the workers?

7. Why is a clean, sanitary factory a good advertisement?

8. Why should employers and employees work together to make work in factories safe for health?

9. How can health habits be learned in a factory?

CHAPTER XXXVIII

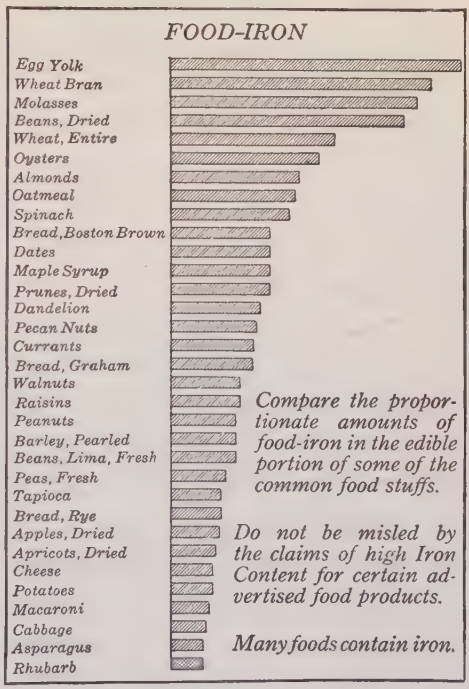
PATENT MEDICINES

Meaning of Patent Medicine. There are really few patent medicines today. A real patent medicine is one on which the United States Patent Office has granted a patent. This gives the person who gets the patent the sole right to manufacture the medicine. Before a patent can be granted, the Patent Office must be convinced that the medicine is both *new* and *useful*. This is so difficult that it is impossible for many medicines to be patented. If a medicine is patented, anybody may find out just what it contains by applying to the Patent Office. Most medicines contain such simple things that if people knew what they contained they would not buy them.

What the manufacturer usually does is to get a very attractive name for his drug. He then registers the name as a trademark. This means that the United States government gives him the sole right to use this name, but does not require him to make public what the medicine contains. So-called patent medicines are seldom patented; they are simply medicines with trademark names.

Why Patent Medicines were so Harmful in the Past. Until within a few years these so-called patent medicines

contained harmful, habit-forming drugs and excessive amounts of alcohol. In many places where alcoholic drinks could not be sold patent medicines were sold and used as alcoholic beverages. Strict laws concerning alcohol now make this almost impossible. Many patent medicines also contained opium, morphine, or cocaine, unknown to the users. Sometimes people formed the dangerous habit of using these drugs by taking patent medicines. The laws today prohibit the use of some harmful drugs in medicines, make the use of others unpractical, and compel others to be advertised on the label when used in patent medicines.



GET YOUR IRON IN FOODS INSTEAD OF IN PATENT MEDICINES

Many So-called Patent Medicines are Frauds. To invest in patent medicines is largely a waste of money,

for their merits are always greatly exaggerated. The law prevents the making of fraudulent statements about a medicine on the label of the bottle or box, but does not prevent such statements from being made elsewhere.

There are some "patent medicines" that claim (outside the label) to cure almost everything, and many of them claim to cure incurable diseases. Cancer and tuberculosis are two of the worst enemies of mankind. The most skillful physicians who have spent their lives in dealing with these diseases have discovered no drug that will bring about a cure, yet patent medicines have claimed to do so. Cases have been known where men's testimonials about the cure of the disease and their death from that disease have been published in the same paper. One of the most-advertised remedies is hair restorer. The most exaggerated claims are put forth, with pictures to illustrate the appearance of the head before and after using the patent medicine. These claims are fraudulent. One of the greatest frauds is connected with facial remedies. One advertises to produce a new skin in forty minutes; wrinkles, freckles, moles, and other facial blemishes will be removed easily. An analysis of this preparation by the American Medical Association showed that it was composed of water, clay, and ordinary perfume. Such preparations are sold for from $2 to $10 a pound. One could buy the powdered clay and perfume and mix them with water for about twenty cents.

The Drug Habit. Not only are most patent medicines either harmful or useless, but they may lead to the bad habit of taking drugs. The medicine-taking habit causes much ill health.

Most simple ailments for which medicines are taken are due to faulty health habits. What should be done is to change the habit, and so get rid of the ailment. To take medicine for it without changing the habit may give some relief for a short time, but finally leads to more trouble.

Some of these medicines may do harm. For example, sour stomach comes from some bad habit. If, instead of correcting the habit, one takes soda for relief, he makes conditions worse. The alkali soda makes the stomach secrete more acid, and this brings on more acid stomach. While most headache remedies relieve headache, frequent use of them changes the blood in such a way that the headaches become more persistent. The repeated use of laxatives establishes the constipation habit, making it more and more difficult to overcome this ailment by following rules of healthful living.

It should be remembered that symptoms like sour stomach and headache are merely signposts. They are put there to tell us of conditions and warn us of danger. To take a drug for the relief of a symptom and not change the habit which causes the symptom is like painting out the warning on a signpost, for one is likely to think that the danger has been escaped.

Health Habits better than Drugs. Our very best friends are health habits. A good complexion is found in habits of cleanliness, eating, drinking plenty of water, elimination, and sleep. It is not found in rouge and toilet preparations. Health habits point the way to beauty and power. If our health habits are right and we still have trouble, the best thing to do is to consult a physician.

Remember

1. Many so-called patent medicines are fraudulent.
2. Patent medicines are usually either useless or harmful.
3. Taking patent medicines often results in the drug habit.
4. Health habits are far better and cheaper than patent medicines.

What other things do you remember from the reading of this chapter?

Health Habits

1. Avoid taking patent medicines.
2. Avoid the habitual use of medicine; instead, prevent symptoms by good physical and mental habits.

Things to Do

1. Appoint a committee to write to the American Medical Association, Chicago, for some printed matter on patent medicines.
2. Appoint another committee to write to your state department of health and the United States Bureau of Chemistry, Washington, D.C., for additional printed matter.

3. Compare the claims on the label for some medicine with those on billboards and in papers.

4. Prepare and deliver a five-minute talk entitled "The folly of forming the habit of taking so-called patent medicine and other medicine."

5. Study the diagram on page 345. Plan a meal which will be rich in iron.

Review and Thought Questions

1. Why do the manufacturers of so-called patent medicines prefer to register the name of the medicine rather than to patent the medicine itself?

2. Do reputable physicians and health experts engage in the manufacture of such medicines?

3. What has been the effect of recent laws relating to patent medicines?

4. Why should one change his habits so as to prevent symptoms rather than habitually take drugs to relieve them?

5. What is meant by the drug habit? Why is it a bad habit?

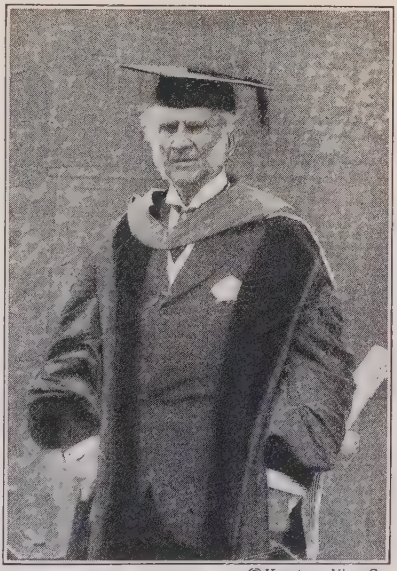
CHAPTER XXXIX

HEALTH DEPARTMENTS

The Right to live a Hundred Years. Dr. Stephen Smith was one of the finest of American citizens. His life was one of rare public service. It was his belief that most human beings could live to be about a hundred years old if proper attention were given to health. So well did he manage his own life by good habits of living that he lacked only a few months of being one hundred years old when he died.

Very early in life Dr. Smith began to realize that even if one had the very best of health habits he could not expect to be healthy if his neighbors were careless about matters of health. About half a century ago the city of New York had unspeakable sanitary conditions. The government took no interest in health. Dr. Smith started a campaign for better public health, and through his efforts a department of health was created. New York is now one of the healthiest cities in the world. This movement spread so rapidly that today we have throughout the country local departments of health and state departments of health. Our national government also takes a keen interest in promoting good health.

Local Departments of Health. The department of health that we have heard most about is probably that of our own village, town, or city. These departments differ greatly in different sections of the country. In some places they are elected by the people, but often they are appointed. Usually there is one member of a board or somebody appointed by a board who takes charge of the work. In some localities, because there is a keen interest in health, the local department is very active; in other communities it does little or nothing unless complaints are made by individuals or by the public.



© Keystone View Co.

DR. STEPHEN SMITH

Founder of the health department of the city of New York. He lived to be nearly one hundred years old

Our largest and best local departments of health have some or all of the activities listed below:

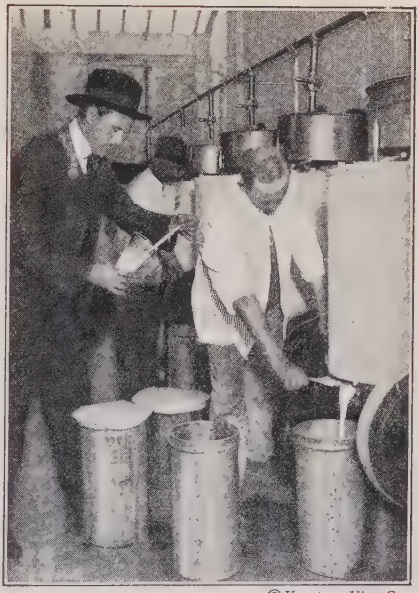
1. *They prevent the spread of communicable disease.* This is made possible by the early detection of disease. Physicians are required to report at once all cases of cer-

tain diseases. If the case is one of the serious diseases like smallpox, scarlet fever, or diphtheria, this may result in the prompt isolation of the patient and a quarantine of the premises. This will prevent the patient from mingling with others until it is safe for him to do so. It may also prevent the other members of a household from going to church or school until danger of their coming down with the disease is past.

2. *They collect statistics.* To safeguard the health of a community a health department and the general public need to know facts concerning the health of the people. Usually a record is kept of births, deaths, and illnesses.

3. *They provide laboratories.* A laboratory is a place where scientific tests and experiments are made. These are very serviceable in the detection and prevention of disease. For example, a citizen may have a sore throat. The physician cannot tell by examination whether it is diphtheria or not. He may take what is called a culture. To do this he touches the throat with a bit of sterile cotton fastened to a stick. This is put at once in a tight bottle and sent to the laboratory. There it is put into some kind of gelatin, which is kept for a number of hours in a warm place. Little colonies of bacteria then begin to form. A microscopic examination may show that the disease is diphtheria. If it is, later cultures from the throat will show whether the person has recovered so that he cannot carry the disease.

4. *They inspect food supplies.* This means the examination of foods, such as milk, to determine whether they contain enough fat and are free from harmful bacteria. Markets and restaurants also may be examined. In some cities all those who handle food for public consumption must have a physical examination to prove that they have no contagious disease. To maintain a pure water supply is usually the duty of the local department of health.



© Keystone View Co.

AN INSPECTOR AT WORK

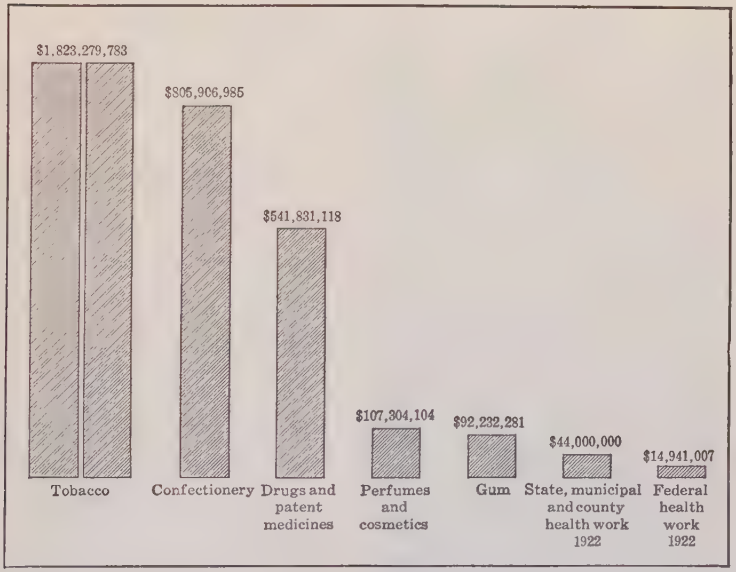
This man is inspecting the milk in an ice-cream factory

5. *They educate the public.* Many health departments bring out reports and bulletins to enlighten the public. The reports tell about the work of the board and the problems of the community. Many of the bulletins are very valuable, because they give advice on a great many topics such as food, exercise, recreation, the care of babies, and health in the home.

State Departments of Health. These departments have many duties similar to those of local departments. They may by law require certain duties of local departments. They always stand ready to advise such departments when these call upon them. Often a state department, with its better equipment and superior force of assistants, may investigate local conditions and assist local health officers. This frequently is done in case of an epidemic. Some state departments concern themselves with rules and regulations relating to the manufacture and sale of foods, candies, and drugs within the state.

The National Government and Health. Our national government does much for the health of its people. This is not done by a single department of health, but is distributed through several departments of the government. Every immigrant who wishes to land on our shores must first of all pass a physical examination. Those who have trachoma—a very bad disease of the eyes—or other serious defects are not admitted. The government also limits the amount of habit-forming drugs like opium and morphine that may be imported. One of its most important duties is to inspect foods that may be shipped from one state to another. So excellent is the inspection of meat that it is sometimes safer to buy meat which has been shipped into the state than that which is prepared by a local market. The United States government also has a wonderful hygienic laboratory where

many important discoveries have been made. This laboratory conducts many investigations throughout the United States and advises state health officers and others.



THE AMOUNT OF MONEY SPENT BY AMERICANS FOR LUXURIES AND FOR HEALTH WORK. NOTICE THE DIFFERENCE

The national government through its various departments also conducts much publicity and educational work. It makes health surveys of communities, provides lectures for public-health meetings, and prints many health bulletins. The following departments and bureaus at Washington, D.C., publish bulletins on health that may be

secured free or at a nominal cost: the United States Public Health Service, the Bureau of Education (Department of the Interior), the Children's Bureau (Department of Labor), the Department of Agriculture, and the Bureau of the Census, covering vital statistics (Department of Commerce).

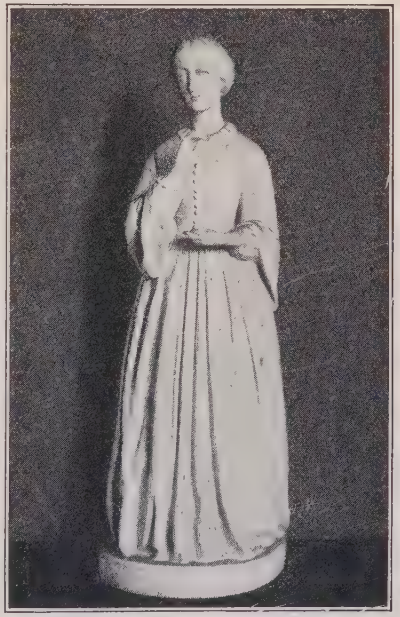
© Keystone View Co.

THE PUBLIC-HEALTH NURSE BRINGS COMFORT AND HOPE TO MANY HOMES

Public-Health Nurses. One of the greatest messengers of good health in America is the public-health nurse. These are employed by various organizations: by departments of health, schools, industrial organizations, and insurance companies. They often give lectures, set up exhibits, and start community health campaigns. One of their duties is bedside nursing. Often they travel over their territory calling upon the sick, rendering first aid, and educating members of the family in matters of health. They brave all sorts of inclement weather and hardships in their work of mercy and good cheer.

The Lady of the Lamp. The woman who did more than any other person to further the work of nursing was Florence Nightingale, whose life was consecrated to service. The story of her life is truly inspiring.

As a girl, Florence Nightingale had everything that most girls want to make her happy. She had plenty of money, good looks, quick wit, talent in music and in writing, and a whole host of friends. She traveled in foreign lands and was introduced at court. And yet she was not satisfied. She wanted to be a nurse, but that was the one wish that her parents would not gratify.



FLORENCE NIGHTINGALE

A great woman, who loved service better than a life of ease

At last, when Miss Nightingale reached the age of thirty-one, her parents, in despair because she did not marry, gave their consent for her to enter a hospital and learn to be a nurse. The head of the hospital looked doubtfully at the well-dressed and refined-looking young woman as she said, "Our nurses

not only nurse but must scrub floors and do other disagreeable manual tasks." But Florence Nightingale liked to do hard things. "Just try me," she said. And so for several months she nursed, and scrubbed floors, and studied. She was an apt pupil, and after finishing her training did some remarkable work in the hospitals of England.

In the year 1854 the Crimean War broke out. England had no nurses to take care of the sick and dying. But Florence Nightingale was prepared. The government called upon her for help. She went to Crimea with forty nurses. The condition of the soldiers was horrible. There were no sanitary facilities, no laundry, no supplies, no food fit for the sick. In the end Florence Nightingale overcame every obstacle. The death rate in the hospitals dropped from between 50 and 60 per cent to 2 per cent, something unknown to the army even in peace times. The soldiers loved her and adored her. Because she passed through the wards of the hospitals at night smoothing the pillows of the sick and nodding and smiling to the wounded, she was called the Lady of the Lamp. The soldiers kissed her shadow as it fell on their heads and pillows. One soldier wrote, "Before she came there, there was such cursing and swearing, but after that it was holy as a church!"

After the war Florence Nightingale returned to England somewhat broken down in health because of over-

work, but she raised a fund of $200,000 to establish the first modern training school for nurses. This school was copied throughout the civilized world.

To the very last day of her life she was interested in doing something for the comfort and happiness of others. She left the world better than she found it, and she left also a beautiful memory of service.

The Health Doctor. Many of the health departments today are emphasizing the desirability of a thorough physical examination of every citizen at least once every year. As a rule such examinations are given only when an individual is ill—sometimes so ill that he is beyond medical aid. Such a plan is about as inefficient as to pay no attention to an automobile until it breaks down. No sensible person would think of dealing in this way with any machine, yet this method is the common one in dealing with the human machine.

In the past the doctor has concerned himself almost entirely with disease, but in the future he will be more and more interested in keeping people well. He will give his patrons a regular physical examination, advise them concerning health habits, and attend them when they are ill. In most cases he will be able to detect the approach of sickness and be able to ward it off. Such doctors are even now beginning to serve communities. They are using their highly scientific knowledge and skill to prevent disease rather than cure it. They are also trying to pro-

mote robust physical health. These should be the goals of every physician, nurse, teacher, and citizen.

Remember

1. Departments of health help to prevent disease.

2. To do their best work departments of health need the support of the public.

3. Dr. Stephen Smith was a splendid citizen.

What other facts do you remember from the reading of this chapter?

Health Habits and Customs

1. Obey all health laws.

2. Read the bulletins of the health department.

3. Take an interest in the work of the health department.

4. Support it with your influence.

5. Help it to educate the people on health. Help it to enforce the laws.

Things to Do

1. Find out more facts about the life of Dr. Stephen Smith.

2. Find out more facts concerning the life of Florence Nightingale.

3. Read Longfellow's poem on Florence Nightingale entitled "Santa Filomena."

4. Appoint three committees to write for rules and regulations and pamphlets on health: one to the local department, one to the state department, and one to the United States Public Health Service Bureau, Washington, D.C.

5. Invite lecturers from the health department and nurses to come and meet with you.

6. Compare the work of your own health department with the activities of health departments referred to in this chapter.

7. Study the diagrams on page 355. For every dollar that is spent for state, municipal, and county health work how many are spent for tobacco? State other problems for the class to work out.

Review and Thought Questions

1. How old did Stephen Smith live to be?

2. How did it happen that although he was interested in personal health he took up public health?

3. What are five important activities of a local health department?

4. How many persons are on your local board of health? Are they elected or appointed? What salary do they receive? What is your local department of health doing for the public? Can you answer these same questions concerning your state department of health?

5. What is your local department of health doing to prevent epidemics?

6. In what way may statistics about health be helpful?

7. How may a laboratory be helpful to a department of health?

8. Is there any kind of food inspection in your community? Tell about it.

9. Does your health department require everybody who handles food to have a license? a physical examination? Why are both requirements desirable?

10. What are your local and state departments of health doing to educate the public?

11. What health work is done by the national government?

12. What is the work of a public-health nurse?

13. In what way did Florence Nightingale show that she had character? What did she do for England and for the world? Why was she called the Lady of the Lamp?

14. How does a health doctor differ from other doctors? Why may he to a large extent replace other physicians?

BIBLIOGRAPHY FOR TEACHERS

METHODS OF HEALTH TEACHING

Andress, J. Mace. Health Education in Rural Schools. Houghton Mifflin Company, Boston.

Andress, J. Mace. Teaching Hygiene in the Grades. Houghton Mifflin Company, Boston.

Andress, J. Mace, and Bragg, Mabel C. "Suggestions on a Program for Health Teaching in Elementary Schools." *Bulletin No. 10*, United States Bureau of Education, Washington, D.C.

Dansdill, Theresa. Health Training in Schools. National Tuberculosis Association, New York.

Payne, E. George. Education in Accident Prevention. Lyons and Carnahan, Chicago.

Payne, E. George. Education in Health. Lyons and Carnahan, Chicago.

The publications of the United States Bureau of Education, Washington, D. C., and the American Child Health Association, 370 Seventh Avenue, New York, are especially valuable.

SUBJECT MATTER ON HEALTH

Broadhurst, Jean. Home and Community Hygiene. J. B. Lippincott Company, Philadelphia.

Broadhurst, Jean. How we resist Disease. J. B. Lippincott Company, Philadelphia.

Gesell, A. The Pre-School Child. Houghton Mifflin Company, Boston.

Hough and Sedgwick. The Human Mechanism. Ginn and Company, Boston.

KENDALL, ARTHUR I. Civilization and the Microbe. Houghton Mifflin Company, Boston.

LUCAS, WILLIAM PALMER. The Health of the Runabout Child. The Macmillan Company, New York.

MCCOLLUM, E. V. The Newer Knowledge of Nutrition. The Macmillan Company, New York.

MCFARLAND, J. Fighting Foes too Small to See. F. A. Davis Company, Philadelphia.

MILLER, H. C. The New Psychology and the Teacher. Thomas Seltzer, New York.

MORGAN, JOHN J. B. The Psychology of the Unadjusted School Child. The Macmillan Company, New York.

THOMA, K. H. Teeth, Diet and Health. The Century Co., New York.

WILLIAMS, J. F. Healthful Living. The Macmillan Company, New York.

WILLIAMS, J. F. Personal Hygiene Applied. The Macmillan Company, New York.

WINSLOW, K. The Prevention of Disease. W. B. Saunders Company, Philadelphia.

Hygeia. A Journal of Individual and Community Health. Published monthly by the American Medical Association, Chicago.

National Health Series. Funk & Wagnalls Company, New York. (Thirty volumes covering the general field of health, written by national authorities. 30 cents per volume.)

APPENDIX

THE USE OF WEIGHT-HEIGHT-AGE TABLES[1]

(Directions of the United States Bureau of Education)

1. *Take the height first.* Nail an accurate measure on the wall. Two yardsticks, a new tape measure, or a drawn scale will serve. Let the child stand, without shoes, flat against the wall, with heels, shoulders, and head touching the wall, and place a right-angled piece of wood (a chalk box will answer) firmly over his head and against the measuring scale.

2. *What is the child's age?* Take the nearest birthday.

3. *Then consult the chart for the proper weight for this child's age and height.* First find the height in the left column and follow across the chart to the appropriate age column. The figure so found is what this child should weigh.

4. *Now weigh the child.* Have the child, in indoor clothing but without shoes, stand in the *center* of the scale platform. Teach the child to weigh himself, but in the monthly weighings the teacher should do the weighing.

5. *Next, the record.* Enter the weight on the classroom weight record. State the monthly weight on the monthly report card. Use one record for each section of the class and pass on with the section when promoted.

6. *Since this chart is chiefly for its educational value, the health lesson is the most important part of the procedure.* Emphasize the need of weight gains each month. Study foods and their relation to growth. Study health habits and their effect upon the weight curve.

[1] These new Weight-Height-Age Tables are a revision, by Bird T. Baldwin and Thomas D. Wood, of the Wood tables formerly used. The figures represent a large group of presumably healthy children, most of whom are native born. These figures are believed to be the most accurate available.

WEIGHT-HEIGHT-AGE TABLE FOR BOYS

Height Inches	5 Yr.	6 Yr.	7 Yr.	8 Yr.	9 Yr.	10 Yr.	11 Yr.	12 Yr.	13 Yr.	14 Yr.	15 Yr.	16 Yr.	17 Yr.	18 Yr.	19 Yr.
38	34	34													
39	35	35													
40	36	36													
41	38	38	38												
42	39	39	39	39											
43	41	41	41	41											
44	44	44	44	44											
45	46	46	46	46	46										
46	47	48	48	48	48										
47	49	50	50	50	50	50									
48		52	53	53	53	53									
49		55	55	55	55	55	55								
50		57	58	58	58	58	58	58							
51			61	61	61	61	61	61							
52			63	64	64	64	64	64	64						
53			66	67	67	67	67	68	68						
54				70	70	70	70	71	71	72					
55				72	72	73	73	74	74	74					
56				75	76	77	77	77	78	78	80				
57					79	80	81	81	82	83	83				
58					83	84	84	85	85	86	87				
59						87	88	89	89	90	90	90			
60						91	92	92	93	94	95	96			
61							95	96	97	99	100	103	106		
62							100	101	102	103	104	107	111	116	
63							105	106	107	108	110	113	118	123	127
64								109	111	113	115	117	121	126	130
65								114	117	118	120	122	127	131	134
66									119	122	125	128	132	136	139
67									124	128	130	134	136	139	142
68										134	134	137	141	143	147
69										137	139	143	146	149	152
70										143	144	145	148	151	155
71										148	150	151	152	154	159
72											153	155	156	158	163
73											157	160	162	164	167
74											160	164	168	170	171

WEIGHT-HEIGHT-AGE TABLE FOR GIRLS

Height Inches	5 Yr.	6 Yr.	7 Yr.	8 Yr.	9 Yr.	10 Yr.	11 Yr.	12 Yr.	13 Yr.	14 Yr.	15 Yr.	16 Yr.	17 Yr.	18 Yr.
38	33	33												
39	34	34												
40	36	36	36											
41	37	37	37											
42	39	39	39											
43	41	41	41	41										
44	42	42	42	42										
45	45	45	45	45	45									
46	47	47	47	48	48									
47	49	50	50	50	50	50								
48		52	52	52	52	53	53							
49		54	54	55	55	56	56							
50		56	56	57	58	59	61	62						
51			59	60	61	61	63	65						
52			63	64	64	64	65	67						
53			66	67	67	68	68	69	71					
54				69	70	70	71	71	73					
55				72	74	74	74	75	77	78				
56					76	78	78	79	81	83				
57					80	82	82	82	84	88	92			
58						84	86	86	88	93	96	101		
59						87	90	90	92	96	100	103	104	
60						91	95	95	97	101	105	108	109	111
61							99	100	101	105	108	112	113	116
62							104	105	106	109	113	115	117	118
63								110	110	112	116	117	119	120
64								114	115	117	119	120	122	123
65								118	120	121	122	123	125	126
66									124	124	125	128	129	130
67									128	130	131	133	133	135
68									131	133	135	136	138	138
69										135	137	138	140	142
70										136	138	140	142	144
71										138	140	142	144	145

DIRECTIONS FOR TESTING SIGHT AND HEARING[1]

Hang the test card of E symbols (see opposite page) in a good clear light (side light preferred) on a level with the head, and so placed that the child does not face a strong light. Place the child 20 feet from the card. Cover one eye with a card held firmly against the nose, without pressing on the covered eye, and have him read aloud, from left to right, the smallest E symbols he can see on the card, stating the direction in which the prongs of each symbol point. Make a record of the result. Young children should be handed an E symbol like those on the card, and should be directed to turn the prongs of the symbol so that the prongs shall point in the same direction as the prongs of each E symbol on the chart.

E SYMBOL FOR CHILD'S USE

There is a number under each line of the test symbols which shows the distance in feet at which these symbols should be recognized by a normal eye. From top to bottom, the lines on the card are numbered respectively 40, 30, and 20. At the distance of twenty feet, the average normal eye should recognize the symbols on the 20-foot line. If this is done correctly, or with a mistake of one or two symbols, the vision may be noted as 20/20, or normal. In this fraction the numerator is the distance in feet at which the symbols are read, and the denominator is the number under the smallest line of symbols read. If the smallest symbol which can be read is on the 30-foot line, the vision will be noted as 20/30; if the symbols on the 40-foot line are the smallest that can be read, the record will be 20/40.

Test the second eye, the first being covered with the card, and note the result as before. With the second eye, have the child read the symbols from right to left, to avoid memorizing. To prevent reading from memory the child may be required to read the symbols in irregular order. A mistake of two symbols on the 20-foot or the 30-foot line and of one symbol on the 40-foot or the 50-foot line may be allowed.

[1] Used by courtesy of the Massachusetts Department of Education. The symbols for the 50-foot line have been omitted and the number of symbols has been reduced. The complete card for testing the eyesight may be secured at a nominal price from the Globe Optical Company, 403 Washington Street, Boston, Massachusetts.

40 Feet

30 Feet

20 Feet

TEST CARD OF E SYMBOLS

Notification of Parents. The teacher will notify the parent or guardian on one of the notice cards, as required by law, whenever the vision in either eye is found to be 20/40 or less. No notice will be sent when the vision is 20/20 in both eyes, 20/20 in one eye and 20/30 in the other, or 20/30 in both eyes.

When glasses are used the vision will be tested with the glasses. A notice card will also be sent when the teacher finds that the eyes or eyelids are habitually inflamed; when there is complaint of pain in the eyes or head after reading or writing, especially toward the end of school hours; when one or both eyes deviate from the normal position,—squinting; when the book is habitually held at less than one foot from the eyes; when there is constant scowling and evident effort in using the eyes.

If the vision is as low as 20/40 in either eye, with glasses, find out, if possible, from the practitioner who prescribed the glasses, whether the child should be reëxamined, or whether his school work should be modified so as to reduce eyestrain. The school nurse may be able to secure this information in coöperation with the parents.

Method of Testing Hearing. If it is possible, one person should make the examinations for an entire school in order to insure an even method. The person selected should be one possessed of normal hearing, and preferably one who is acquainted with all the children, the announcement of an examination often tending to inspire fear.

The examinations should be conducted in a room not less than 25 or 30 feet long, and situated in as quiet a place as possible. The floor should be marked off with parallel lines one foot apart. The child should sit in a revolving chair on the first space.

The examination should be made with the whispered or spoken voice; the child should repeat what he hears, and the distances at which words can be heard distinctly should be noted.

The examiner should attempt to form standards by testing persons of normal hearing at normal distances.

In a still room the standard whisper can be heard easily at 25 feet; the whisper of a low voice can be heard from 35 to 45 feet and of a loud voice from 45 to 60 feet.

The two ears should be tested separately.

The test words should consist of numbers 1 to 100, and short sentences. It is best that but one pupil at a time be allowed in the room, to avoid imitation.

EXERCISES TO PROMOTE GOOD POSTURE AND TO CORRECT FAULTY POSTURE

(Primarily for the teacher)

By Esther Wilson Klein, Instructor in Boston School of Physical Education

GROUP I

A series of exercises that are given with the intention of correcting faulty posture should always start with posture training.

This means that we have the class practice standing with the feet parallel, the weight in front of the ankle joint, the knees easy, the lower back flat with the abdomen in, the shoulders low with ribs well spread, and the chin low with neck back (see Fig. 1, showing good and bad posture).

FIG. 1

The next step is training in breathing, for if we breathe correctly our posture will be good. But it is also true that if our posture is good we breathe correctly.

We first assume a straight position and then put the hands on either side of the front of the ribs (see Fig. 2). Next we take a deep breath, spreading the ribs on each side out as far as possible. We now let out the breath, taking care to keep the abdominal muscles firm while this is being done (see Fig. 3).

When we carry ourselves poorly our muscles become shorter than normal in some places and our movements become limited. It then becomes necessary to stretch our muscles in order to be able to assume a good position.

FIG. 2

FIG. 3

STRETCHING EXERCISE

Description. Standing with the hands crossed over the head, stretch up, spreading the ribs and muscles, first on one side and then on the other (see Fig. 4). Next spread the arms diagonally up, out, and backward (see Fig. 5). From this position stretch the arms upward and backward. After stretching them well five or six times, lower them slowly, keeping the ribs spread well until the arms are down. Relax and repeat about eight times.

Purpose. To stretch the muscles on the sides of the back and chest and to stretch the muscles on the front of the chest which, when tight, would keep the shoulders forward.

Note. Be careful, in doing this exercise, that the back does not get hollow and the upper back or shoulders rounded. Also be careful not to hunch the shoulders. This would let the head come forward, and of course we do not want that.

FIG. 4

FIG. 5

BACK EXERCISE

In this place in the group we will do an exercise which works on the back muscles.

Description. Sit in the chair with feet flat on the floor. Clasp the hands behind the back with the elbows straight. Bend the head forward until it touches the knees (see Fig. 6). First pull in the abdominal muscles tightly. Then slowly straighten the lower back. Next raise the upper

back, then the shoulders and head. Lastly, pull down hard with the arms, making the shoulder blades flat and the whole spine straight (see Fig. 7).

Purpose. This exercise works on the back muscles with the object of strengthening the whole spine.

FIG. 6

FIG. 7

Note. It is necessary to see that each part of the spine is straightened separately, and that, in finishing, an overcorrected position does not result, namely, a hollow lower back and a double chin.

We next come to the exercise in our list which requires the most work. Many times necks are the hardest part of the spine to make straight, so the following exercise will be for that region.

NECK EXERCISE

Description. Sit with the entire back straight against the chair. Keep the back in this position while you drop the head on the chest (see Fig. 8). The person in the seat behind puts his hand on the base of the

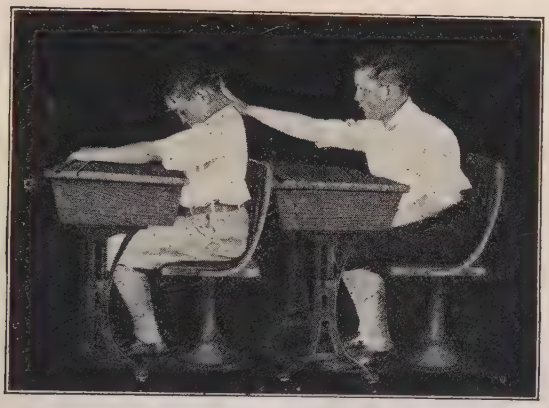


FIG. 8

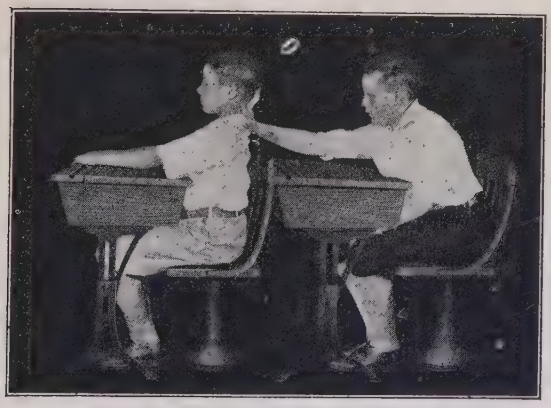


FIG. 9

skull of the person in front. The person in front raises his head while the one in back resists rather strongly his attempt to do so (see Fig. 9).

Purpose. The resistance makes the neck muscles work harder, so that it is easier to feel them pull. This exercise corrects a forward head.

Note. The person resisting should be careful not to offer too much

resistance, and the person working should be sure to keep the chin in as he raises his head.

An exercise which will make us more flexible comes now on our list and stretches strongly the muscles which are tight.

FIG. 10

FIG. 11

FLEXIBILITY EXERCISE

Description. Take an A posture position and then stretch the arms over the head (see Fig. 10). Bend forward quickly, keeping the knees straight, and touch the hands to the floor (see Fig. 11). Come to an upright position again, stretch the arms over the head and repeat the forward bending.

Purpose. This exercise keeps the lower back from developing a hollow that would become inflexible and hard to correct.

Note. Be sure to keep the knees straight in bending forward, and in coming to the upright assume quickly an A posture.

Last of all, in this group of exercises we do breathing which helps us to think again of our standing position.

Hold the chest high and, without lowering it, breathe, spreading the ribs well to each side. Also try to see if you can get them to come out in front, always remembering, however, to keep the abdomen flat while breathing.

FIG. 12

GROUP II

In this second group of exercises, which are a little more difficult, we start with posture training as we did in the first group.

Besides taking a good position as we stand beside the desks, we should try walking around the room trying to keep the feet toeing straight ahead, walking lightly, swinging the arms from the shoulders, and remembering to keep the back straight and the head high.

After posture training we do breathing. We try this time to stretch the arms out at the side and see if we can breathe without raising the chest, just spreading the ribs sideward and remembering always to keep the abdomen flat all the time while we are breathing (see Fig. 12).

STRETCHING EXERCISE

Description. Stand in the best position and then stretch both arms diagonally up beside the head. Keeping a straight back, bend to the left

FIG. 13

FIG. 14

side slightly and then to the right side, each time stretching a little more than the time before (see Fig. 13).

Purpose. This exercise aims to stretch the back muscles on the side, so that it will be more possible to get and to retain a good posture.

Note. Be careful to see that the back is held well and does not tip backward or forward as the exercise is done (see Fig. 14). This would be made easier by standing with the feet wide apart.

We next work on an exercise which helps all the back and abdominal muscles as well as the leg muscles.

TURKEY WALK

Description. We assume an A posture and clasp the hands behind the back. Next bend the left knee up as high as possible (see Fig. 15), then

FIG. 15

FIG. 16

stretch it out in front, and finally lower it, having the heel touch the floor first as you step (see Figs. 16 and 17). Do exactly the same with the other foot and continue to walk down the aisle in this way.

Purpose. To hold the upper back and head in a good position while we put the body in motion. To exercise the muscles which keep the lower back straight and to learn to hold the whole body well when it is hard to balance it.

Note. The exercise should be done rather quickly at first, since this helps in balance. Then it should be done slowly and with good control.

FIG. 17

Fig. 19). Bend the arms again and repeat.

Purpose. This exercise strengthens the upper back muscles and also the arms. Sitting cross-legged helps us to keep the lower back straight.

Note. Be sure that the head is well back and that the spine is kept straight all the time we are working.

As in our other group we had a flexibility exercise, so in this one we should do something which helps to limber us.

Now we come to the exercises in the list which call for the most work, because someone else is offering resistance to the muscles.

WAND EXERCISE

Description. We sit on the floor cross-legged. (In most schoolrooms there will be no chance to get wands, so we will use the hands in place of them.) Then we grasp the wrist of the person who is going to help, keeping the elbows bent in to the side with the fists at shoulder level (see Fig. 18). The object is to push the arms straight up over the head while the person helping slightly resists our attempt to do so (see

FIG. 18

AËROPLANE EXERCISE

Description. We stand with the feet wide apart and stretch the arms over the head (see Fig. 20). We bend the body forward and touch the toe of the right foot with the left hand (see Fig. 21). We straighten the body

FIG. 19

to an A posture with the arms stretched upward, and then again bend forward, touching the left foot with the right hand (see Fig. 22). Again come to the upright. Repeat the whole exercise, bending and straightening as quickly as possible.

Purpose. This exercise aims to make the middle and lower back more flexible, stretching well the muscles on each side.

Note. Be sure the knees are kept straight all the time, particularly as we bend over. In coming to the upright position we must be careful not to hollow the back or round the shoulders.

FIG. 20

FIG. 21

FIG. 22

LASTLY WE DO A BREATHING EXERCISE

(To be done without commands, each child breathing as deeply as he can.)

Description. Put the hands on top of the chest and breathe, raising it as high as possible. Then lower it. Do this five times and then put the

FIG. 23

hands on the sides of the chest and breathe five times, spreading the ribs toward the side. Last of all put the hands on the front of the chest just where the ribs begin to divide, and breathe, pushing the ribs forward as far as possible five times (see Fig. 23).

Note. Always keep the abdomen flat, never allowing it to become prominent.

These two groups of exercises that have been outlined aim to give a simple postural training to the muscles which are apt to be relaxed, or tight, as the case may be, in a poor standing position.

PRONOUNCING VOCABULARY AND INDEX

KEY. āle, senāte, ăt, câre, åsk, ärm, finạl, ạll; ēve, ẽvent, ĕnd, hẽr, recẹnt; īce, ĭll, admịral; ōld, ŏbey, ŏn, fôr, anchọr; ūse, ŭnite, ŭp, fûr, circụs, menü; fo͝od, fo͝ot; ch *as in* chop; g *as in* go; ng *as in* sing; n̰ *as in* ink; th *as in* thin; th *as in* the; oi *as in* oil; ou *as in* noun; N (*the French nasalizing* n), *nearly like* ng *in* sing; K *as in German* ich, ach.

Absorption (ăb sôrp′shụn), 73; in small intestine, 73–74
Accidents, causes, 175–177. *See also* Emergencies
Addams, Jane, 262
Adenoids (ăd′ẽ noidz), 13, 115, 121
Adrenals (ăd rē′nạlz), 98, 99
Agramonte (ä grä mōn′tā), Dr., 300
Air. *See* Breathing, Humidity, Ventilation
Alcohol (ăl′kŏ hŏl), 191–196, 345
American Child Health Association, 305
American Red Cross, 4–5
Anatomy, 16
Anopheles (å nŏf′ẽ lēz), 302
Anthrax (ăn′thrăks), 215
Antibodies, 209–210
Antiscorbutic *C* (ăn tī skŏr bū′tĭk), 88
Antiseptic, 207
Antitoxin (ăn tī tŏk′sĭn), 209; diphtheria, 236
Antrum (ăn′trụm), 70
Aorta (ā ôr′tạ), 105
Arnold, Benedict, 151
Arteries (är′tẽr ĭz), 21, 105, 106, 108
Artificial respiration, 182–184, 185
Asphyxiation (ăs fĭk sĭ ā′shŭn), 182
Astigmatism (å stĭg′mạ tĭz′m), 161, 162
Athletic badge, 35–37; tests for, 39
Attention, 150
Auditory (ô′dĭ tŏ rĭ) canal, 165, 167
Auditory nerve, 166–167
Auricles (ô′rĭ k'lz), 104–105, 106–107, 117
Babies, 244–251
Bacilli (bå sĭl′ī), 202; of tuberculosis, 222, 223; of diphtheria, 236; of measles, 240
Backbone, 25, 119
Bacteria (băk tẽ′rĭ ạ), 63, 91, 200–204, 206–211; in milk, 214, 290–296; Pasteur's work with, 214–218; Lister and, 218; of colds, 229–233; in water, 283, 287–288; in the city, 324
Banting, Dr. F. G., 100, 101
Barton, Clara, 4–5
Bathroom, care of, 270
Baths, 132
Beans, 70, 79, 86, 88
Bedbugs, 270, 278
Bed-making, 276
Beriberi, 88
Bile (bīl), 72–73, 83
Blackheads, 132
Bladder, 75
Blood, in digestion, 68, 73–74; effect of ductless glands on, 95–96; composition of, 103–104; circulation of, 104–107, 117; carrier of oxygen, 113
Body temperature, 136
Bones, 19, 23; composition of, 24–25; nourishment of, 27–28; of feet, 51, 53; growth of, 99
Bony system, 21, 23–28
Brain, 19; protected by skull, 23, 25, 26; needs oxygen, 114; nervous center, 144–146; in shock, 187
Breakfast, 90–91
Breastbone, 25
Breathing, 113–119
Bronchi (brŏn̰′kī), 116

Bronchitis (brŏn kī′tĭs), 118, 230
Bruises, 188
Bubonic (bū bŏn′ĭk) plague, 309–310
Bunions (bŭn′yŭnz), 53
Burns, 188

Calories (kăl′ō rĭz), 79
Camping, 1–4, 335
Canal Zone, 299–305
Cancer, 346
Candy, 63, 80–83
Capillaries (kăp′ĭ lă rĭz), 105–106, 108, 110; in air cells, 116–117; in the skin, 131
Carbohydrates (kär bō hī′drāts), 79
Carbon dioxide, 75, 109, 110, 114, 117, 122; in bread, 201
Carbon monoxide poisoning, 189
Care of person, 131–136
Cariez (kā′rĭ ēz), 61; cause of, 62, 64
Carpets, 268–269
Carriers of disease, 293
Carroll, Dr., 300, 301
Cartilage (kär′tĭ lăj), 19, 25, 27, 116, 121; in the ear, 165
Catarrh (kȧ tär′), 115
Cells, 16–18; nerve, 19, 20, 146–148; body, 102–103, 109; life of, 110; air, 116, 117
Cellulose (sĕl′ū lōs), 74
Cerebellum (sĕr ē bĕl′ŭm), 146
Cerebrum (sĕr′ē brŭm), 146
Cesspools, 266
Chest, 25
Chewing, 69
Chivalry, 9–10
Chlorine as water purifier, 288
Cholera (kŏl′ĕr ą), 283; chicken, 216
Choroid (kō′roid) coat of eye, 158
Cilia (sĭl′ĭ ą), 118, 207
Circulatory system, 21, 102–111; effects of bad posture on, 44; discovery of, 102
Citizenship, 1–8, 314–322
City, health in, 327–328
Cleanliness, for beauty, 132, 138; enemy of tuberculosis, 225; in schools, 257; in the home, 268–273; in care of disease, 277–279; of milk, 290–293
Clean-mindedness, 10, 149–153
Clothing, 136–139
Cocci (kŏk′sī), 202
Cochlea (kŏk′lē ą), 166, 167
Colds, 115, 118, 229–234
Collars, 138
Colon (kō′lŏn), 74
Community welfare, 314–322
Complexion, 129
Connective tissue, 19, 20, 21
Constipation, 44, 347
Contagion, prevention of, 253
Convulsions, 187
Cooking, 91–92
Cornea (kôr′nē ą) of eye, 158, 161
Corns, 52; treatment, 56
Corpuscles (kôr′pŭs ′lz), red, 103–104; white police cells, 104, 208; affected by hookworm, 329
Cosmetics, 132–133
Cotton for clothing, 137
Coughing, 230, 232, 233
Country, health in, 324–327
Cramps, 187
Cream, 79, 89
Cretinism (krē′tĭn ĭz′m), 96–97
Criticism, 150
Cross, Dr. Dewit, 61
Culex (kū′lĕks), 305
Cuny, Lucine, 182
Cuts, 188

Daydreams, 152
Dead air, 124
Deafness, 115, 166
Deep breathing, 119
Deodorizers, 272
Dermis (dûr′mĭs), 129, 130
Diabetes (dī ą bē′tēz), 99–100
Diaphragm (dī′ą frăm), 119
Diet, balanced, 89–91
Digestive juices, 70–73; harmful to bacteria, 207
Digestive system, 21, 68–74, 85
Dinner, 90–91
Diphtheria (dĭf thē′rĭ ą), 5; conquest of, 236–238; how to avoid, 238; spread of, 278, 290, 293
Disease, 4, 104, 213; prevention of, 2, 241, 253–254; heart, 107–108; pro-

tection of babies from, 247–248; care of the sick, 275–280
Dishcloths, 271–272
Dishes, 270–271
Disinfectants, 272
Drinking at meals, 86
Drinking-cups, 237, 334
Drowning, 182–184
Drugs, habit-forming, 345, 347; narcotic, 347
Ductless glands, 95–101
Dusting, 269
Dysentery (dĭs′ẹn tĕr ĭ), 283

Ears, 165–167; care of, 167
Eczema (ĕk′zĕ mạ), 341
Eggs, 70, 85, 89
Elimination (ē lĭm ĭ nā′shụn), 74–75, 131
Emergencies, 182–190, 334–335
Emetics, 186
Energy, 77, 78, 82, 83
Epidemics, 253
Epidermis (ĕp ĭ dûr′mĭs), 129–130
Epiglottis (ĕp ĭ glŏt′ĭs), 69
Epithelial (ĕp ĭ thē′lĭ ăl) tissue, 18, 20, 134
Esophagus (ẹ̆ sŏf′ạ gụs), 69, 206
Eustachian (ụ̊ stā′kĭ ạn) tube, 116, 166
Excretory (ĕks′krẹ̆ tŏ̊ rĭ) system, 21, 85, 111
Exercise, 30–31, 325, 327, 328
Exercises, 119; for good posture, 46–47; for the feet, 55
Eyeglasses, 156–157, 160, 161
Eyes, 156–165; structure of, 158–159; to remove dirt from, 163; care of, 164–165; natural protection of, 207

Fainting, 186
Farsightedness, 160
Fats, 79, 83–84
Fat-soluble *A*, 87–88, 89
Feet, structure of, 51–52; care of, 52–56
Fermentation, 214
Fibers, 19
Filters, 285, 287
First aid, 182–189; kit for, 334–335
Fisher, Dr. Irving, 6
Fleas, 309–311
Flies, 4, 307–308
Floors, 268
Flour, 88
Focus, 159–161
Food, 42, 67–92; effect on bones, 27; rich in lime, 62; for babies, 244, 245, 247; inspection of, 316–317, 353
Forsyth Dental Infirmary, 59–60
Fresh air, for tuberculosis, 223–225; for babies, 248–249; in good housing, 265–266
Fruits, 62, 74, 81, 88
Frying, 91

Gall (gạl) bladder, 72
Garbage, 4, 307, 328
Gas, 189
Gastric juice (găs′trĭk jo͞os), 70
German measles, 241
Germs, 202–204
Glands, 18; salivary, 69; kidneys, 75; ductless, 95–101; perspiratory, 131; oil, 131, 134; nerve control of, 144; of ear, 165; tuberculosis of, 222, 291
Glucose (glo͞o′kōs), 81
Goiter (goi′tẽr), 96–98
Goldthwait, Dr., 44
Good Posture League Pin, 46
Gorgas, General, 301, 302–303, 304
Grant, General, 151
Growth, 99
Gums, 62

Habits, 6, 11, 12, 13; sugar, 80–81; mental, 149–153; safety, 170–178; to prevent diphtheria, 238; in the home, 272, 273–331, 348; vacation, 333
Hæmoglobin (hē mŏ̊ glō′bĭn), 103, 110
Hair, 18, 134
Hair restorers, 346
Handkerchief, 231, 232
Harvey, William, 102, 103, 106
Headache, 44, 157, 347
Health, 2–6; effect of posture on, 44–45; care of feet and, 50–56; effect of good teeth on, 60–61; effect of ductless glands on, 95–101; beauty of, 129, 210; of babies, 244–251;

housing and, 263–266; in the home, 268–280; of cows, 290–291; in country and city, 324–331; in industry, 338–342; public, 350–362
Health bank, 15
Health chores, 12
Health crusaders, 10–14, 36, 225–226
Health departments, 350–360; value of, 351–353
Health doctor, 359–360
Health schedule, 15
Hearing, 142, 143, 165–167; how we hear, 165; testing, 368–370
Heart, 20, 21, 23; effect of exercise on, 31; effect of bad teeth on, 61; effect of adrenalin on, 98; a pump, 104, 117; effect of disease on, 107
Heat prostration, 186
Heating, 265
Heels, 53
Height, 13, 96–99; tables of, 365–367
Hip, 27
Home, 268–273
Hookworm, 329–330
House fly, 307–308
Housing, 260–266; requirements for, 264–266
Hull House, 262–263
Human body, 16, 18–21; composition of, 20; training in use of, 42–47
Humerus (hū′mĕr ŭs), 26
Humidity, 124
Hydrophobia (hī drō fō′bĭ ą), 216–217
Hygiene, 16; of the voice, 121–122; of travel, 333–334; industrial, 338–342

Ice, 288
Images, 159
Immunity, 210, 215, 236–238
Indians, food of, 42; posture of, 43; foot health of, 50
Indigestion, 44, 83
Industries, hygiene in, 338–342
Infection, 206
Influenza, 314–316
Inoculation, 215, 236–238
Insect-borne diseases, 278
Inspection of food, 353
Insulin (ĭn′sŭ lĭn), 100
Intestinal juice (ĭn tĕs′tĭ nąl jōōs), 72
Intestines (ĭn tĕs′tĭnz), small, 69, 70, 73; large, 74; hookworm in, 329
Iodine (ī′ō dīn), 96, 97, 98
Iris of eye, 158
Isolation of serious disease, 352

Jean, Sally Lucas, 305
Joints, 26–27
Junior Public Health Organization, 319–320
Junior Safety Councils, 172

Kidneys, 18, 75, 85, 111
Knights, training of, 9–10; modern, 10–12

Laboratories, health, 352
Lachrymal (lăk′rĭ mąl) gland, 95
Laryngitis (lăr ĭn jī′tĭs), 230
Larynx (lăr′ĭnks), 121
Lazear, Dr., 300, 301
Length of life, 5, 6
Lens of eye, 158–159
Lesseps, Ferdinand de, 299
Lettuce, 79, 86, 88
Ligaments (lĭg′ą mĕnts), 27; of the feet, 51; growth of, 99; in ear, 165
Lighting, 253, 264–265
Lime, effect of, on teeth, 62, 86; in food for babies, 246
Lincoln, Abraham, 153
Lister, Sir Joseph, 218
Liver, 18, 20; work of, 72, 73, 95
Louse, 308–309
Lungs, 20, 23, 118–119; effect of exercise on, 31; elimination by, 75; blood in, 107, 111
Lymph (lĭmf), 108–109, 110
Lymphatics (lĭm făt′ĭks), 109–110

Macleod, Professor J. J. R., 100, 101
Malaria (mą lā′rĭ ą), 5, 202, 278
Malnutrition (măl nū trĭsh′ŭn), 121
Manicuring, 135–136
Marrow of bones, 25, 103
Massachusetts Department of Public Health, instructions for care of teeth, 65; directions for testing sight and hearing, 368–370

Meals for children, 90–91
Measles, 240–241, 278
Meat, 83, 85
Medicines, 344–349. *See* Patent Medicines
Medulla (mĕ dŭl′ą), 146
Meister, Joseph, 217
Mental health, 142–153
Microbe, 202
Microscope (mī′krŏ skōp), 102, 105, 106; cells seen under, 16–21, 116, 200–204
Milk, for good teeth, 62; as fuel, 78; pasteurized, 214, 244; carrier of bacteria, 240; for babies, 246; pure, 290–296, 326, 335
Mind, health of, 142–155
Minerals in food, 79, 86
Modern Health Crusaders, 10–15, 36, 225, 226
Moisture in air, 124. *See* Humidity
Morphine, 187
Mosquitoes (mọs kē′tōz), 4; as disease carriers, 301–305; protection against, 305–307
Mouth, care of, 59–65; digestion in, 68–69; protection of, 206
Mouth-breathing, 115
Mucous (mū′kụs) membrane, 115
Mufflers, 138
Mumps, 241
Munsen, Colonel, 52
Muscles, contraction and expansion of, 19; use, 23, 25, 30, 33, 149; of the feet, 51; in digestion, 70; storage in, 80; nerve control of, 99, 144; heart, 104, 107; eye, 159, 160, 161
Muscular system, 21, 23
Muscular tissue, 19

Nails, 18; treatment of ingrowing, 56; care of, 135–136
National Tuberculosis Association, 226
Nearsightedness, 160–161
Nerves, 144–153, 158, 187
Nervous system, 21, 142–149
Nervous tissue, 19
Nervousness, 44
Nightingale, Florence, 357–359
Nitrogen, 113, 201
Nose, 114–115, 207
Nosebleed, 186
Nucleus (nū′klĕ ụs), 17
Nursing, 275–280
Nuts, 85

Oil glands, of skin, 131; of hair, 134
Opium, 187
Optic nerve, 158–159
Organs, 20
Outhouses, 329
Oxidation, 113
Oxygen (ŏk′sĭ jẹn) in the blood, 103, 105, 106–107, 109, 117; needed by the body, 110, 113

Pains, 187
Palate, 121
Pancreas (păn′krē ăs), 70–72, 100
Pancreatic juice (păn krē ăt′ĭk jōōs), 70, 72, 83
Papillæ (pą pĭl′ē), 130
Parathyroids (păr ą thī′roidz), 99
Pasteur (pȧs tûr′), Louis, 213–218
Pasteurization (pȧs tẽr ĭ zā′shụn), 214, 244, 293–294
Patent medicines, 344–349
Peristalsis (pĕr ĭ stăl′sĭs), 70
Personal attractiveness, 129
Perspiration (pûr spĭ rā′shụn), 74, 132; cools the body, 75, 131, 136
Perspiratory (pĕr spīr′ą tŏ rĭ) glands, 131
Phagocytes (fă′gŏ sīts), 208
Pharynx (făr′ĭnks), 115, 121
Phlegm (flĕm), 207
Physical examination, 255
Physiology, 16
Pineal (pĭn′ē ąl) body, 99
Pituitary (pĭ tū′ĭ tą rĭ) body, 99
Plasma (plăz′mą), 103
Playground and Recreation Association, 35
Playgrounds, 31–33, 244
Pneumonia (nū mō′nĭ ą), 118, 229, 230, 231; how to avoid, 232; spread of, 278; in the city, 328
Poison ivy, 335–336
Poisoning, first-aid treatment for, 184 186

Posture, 42–47, 53, 371
Pot liquor, 92
Potatoes, 80, 81, 89
Protein (prō′tē ĭn), 70, 79, 84–85
Protoplasm (prō′tō plăz′m), 17
Pulmonary (pŭl′mō nā rĭ) artery, 106
Pulmonary vein, 107
Pulse, 107–108; how to take, 277
Pupil of eye, 158
Purifying water, 286

Quarantine, 352

Rabies (rā′bĭ ēz), 216-217
Rats, 309–310
Reading habits, 12
Recreation, 148–149
Reed, Major Walter, 300, 302
Respiration, 118; artificial, 182–184, 185
Respiratory (rĕ spīr′ą tō rĭ) system, 21, 113–122
Rest, 147
Retina (rĕt′ĭ ną), 158
Rheumatism (rōō′mą tĭz′m), 61, 120
Ribs, 23, 25, 118
Rice, 88
Rickets, 28, 88, 125; in the city, 327
Riis (rēs), Jacob, 260–262
Roberts, Miss Lydia, 82
Roosevelt (rō′zĕ vĕlt), 149, 152, 261
Round shoulders, 119
Rubber garments, 137

Safety first, 170–178; common causes of accidents, 175–177; safety week, 177; how to avoid colds, 232–233
Salads, 88
Saliva (są lī′vą), 69, 95; as an antiseptic, 207
Salivary (săl′ĭ vă rĭ) glands, 69
Sanitary surveys, 320–322
Scalp, care of, 135
Scarlet fever, 239–240, 278, 293
Schick test, 237–238
School building, 253, 254, 257
School housekeeping, 256–257
School nurse, 256
School physician, 254–256
Schools, 253–257
Sclerotic (sklĕ rŏt′ĭk) coat of eye, 158
Scott, Sir Walter, 36
Scouts, Boy, 38, 171; Girl, 38
Scrofula (skrŏf′ū lą), 222
Scurvy (skûr′vĭ), 88
Sebaceous (sĕ bā′shŭs) glands, 131
Secretions, 95–96
Self-reliance, 2
Semicircular canals, 166
Sense organs, 142–143, 144
Service, 9, 256–257, 314–322
Setting-up exercises, 47
Sewage, 266, 283, 328
Shampooing, 135
Shock, 187
Shoes, 52–56
Sick, home care of, 275–280
Sickness, causes of, 175–177
Sight, 142, 143, 158–165; testing, 162, 368–370
Sinuses (sī′nŭs ĕz), 229–230
Skeleton, 23; parts of, 25–27
Skin, 18, 74, 129–133; a protector, 206
Skirts, 139
Skull, 23, 25
Sleep, 147–148, 318
Sleeping-porches, 266
Smallpox, 5
Smell, 143
Smith, Dr. Stephen, 350
Smoking, 122, 197
Sneezing, 230, 232, 233
Soft drinks, 83
Soft palate, 121
Sore throat, 238
Spinal cord, 144, 146
Spirilla (spī rĭl′ą), 202
Sportsmanship, 30–39; rules, 34, 35
Sputum (spū′tŭm), 223, 230, 278
Starch, digestion of, 69, 72; as food, 79, 80, 81
State Department of Physical Education of New York, 33
State Health departments, 354
Stecher, Dr. W. A., 37–38
Stegomyia (stĕg ō mĭ′yą), 302
Sterilizing, 265, 279
Sternum, 25
Stomach, 20, 69, 70
Stoves, 189

Straus (strous), Nathan, 244–245
Streptococci (strĕp tŏ kŏk′sī), 202
Stretching, 46
Success, tests for, 142
Sugar, effect on teeth, 63; starch changed to, 69; work of intestinal juice and pancreas on, 72; in food, 79, 80
Sunshine, effect on bones, 27–28, 125–126; kills germs, 204; for tuberculosis, 223–225; for babies, 248–249; for good housing, 264–265
Supper, 90–91
Swallowing, 69
Sweat, 131
Sympathetic nervous system, 146

Taft, W. H., 4, 245
Tan, 129
Taste, 143
Tears, 207
Teeth, 18, 59–65, 83
Temperature of the body, 136; taking the, 277
Tendons, 19, 24, 25, 99
Thorax (thō′răks), 25
Thyroid (thī′roid), 96
Tissues, 18–21; bony, 25; fatty, 84; repair of, 84–85; oxidation of, 114
Tobacco, 197–198
Toes, 52–53
Tongue, 69, 143, 206
Tonsillitis, 107
Tonsils, 13, 119–121
Toothbrush, use of, 65
Towns, health in, 328–329
Toxin (tŏk′sĭn), 209, 236
Trachea (trā′kē ą), 116
Traveling, hygiene of, 333
Trudeau (trōō′dō), Dr. E. L., 220–226
Tuberculosis (tū bûr kū lō′sĭs), 220–226; protection from, 88, 346; spread of, 278, 290; bovine, 291, 293; in the city, 328; in industries, 338–339
Tympanic (tĭm păn′ĭk) membrane, 165
Typhoid (tī′foid) fever, 5; spread by water, 283–284, 287; carried by milk, 290, 293, 294–295; carried by flies, 308

Ultra-violet rays, 126
Underwear, 137
United States government and health, 354–356
Urine (ū′rĭn), 75

Vacation, 333–336
Vacuum cleaner, 269
Valves, of heart, 104–105; in veins, 107
Vegetables, 62, 74; carbohydrates in, 79, 83; lime in, 86; vitamins in, 87, 88
Veins, 21, 106
Vena cava (vē′ną kā′vą), 106
Ventilation, 113, 122–126, 253
Ventricles (vĕn′trĭ k'lz), 104–105, 106
Vertebræ (vûr′tē brē), 25
Villages, health in, 328–329
Villi (vĭl′ī), 73
Vitamins (vī′tą mĭnz), 79, 82, 86–89, 91–92
Vocal chords, 121, 122
Voice, 115, 121–122

Walking, 36–39, 133
Wastes, 111
Water, need of, 75, 86, 282; as food, 79; purity of, 282–288; in the country, 325–326; in the city, 327; on vacation, 335
Water-soluble *B*, 88
Webster, Noah, 213
Weight, 13; charts of, 15, 82; of babies, 247; tables of, 365–367
Wells, 284–285
Wheat, 88
White flour, 88
Whooping cough, 241, 278
Windpipe, 116
Working conditions, 338–343
Wounds, 188

Yeast, 200–201
Yellow fever, 5, 278, 299–305